# Machine Shop

APRIL, 1944

ontents

HOWARD CAMPBELL, Editor

# Published monthly by GARDNER PUBLICATIONS, Inc. 431 Main St., Cincinnati 2, Ohio

# DON G. GARDNER President and General Manager

### JOHN M. KRINGS Advertising Manager

### G. M. FILLMORE 342 Madison Ave. New York 17 Murray Hill 6-3899

### GEORGE H. MEYERS Tribune Tower, Chicago 11 Superior 2290

#### CHARLES H. DEILY, JR. 310 West Durham St. Philadelphia 19 Chestnut Hill 1198

#### RALPH M. FRENCH 627 Union Commerce Bldg. Cleveland 14, Ohio Main 2866

### Member

# CEA

### Printed in U. S. A.

### Copyright 1944 by Gardner Publications, Inc.

## CONTENTS

By Gerald Eldridge Stedman
Lockheed Employees' New Cafeteria and Commissary13  By Fred M. Burt
Yes—Deepfreezing Helps
Machine Shop ''Magic''
Tooling the Automatic Screw Machine, X
Ideas from Readers
—Ratchetless Ratchet Wrench
—Simple Attachment Holds Work in Bench Vise, By A. H. Waychoff
-Spring Type Clamp Milling Fixture, By Alex S. Arnott23
—Understanding Behavior of Hinged Motor,  By W. F. Schaphorst
—Offset-Type Carboloy Tipped Tool Conserves  Materials
New Shop Equipment258
Services Directory
"Where To Get It"392
Cartoon
"The Last Word"398
Index to Advertisements401



# To Increase Output...

see that every lathe, planer and shaper is equipped with the correct ARMSTRONG TOOL HOLDER. With the correct ARMSTRONG TOOL HOLDERS you can greatly increase speeds and feeds, can safely do most standard machining operations efficiently at speeds often double those accepted as "standard," can double output per man, per machine tool and per hour. Tooled up with ARMSTRONG TOOL HOLDERS you will be able not only to reach new "highs" in production, you will be able to maintain them, because ARMSTRONG TOOL HOLDERS last indefinitely—will stand up to the hardest usage year after year.

# ARMSTRONG BROS. TOOL CO.

CTOOL HOLDS IN THE SECRET OF SECTION REPORTS PROPERTIES

"The Tool Holder People"



328 N. Francisco Ave. Chicago 12, U. S. A. Eastern Warehouse and

Eastern Warehouse and Sales: 199 Latayette St., New York



# Machine Shop

APRIL, 1944

Vol. 16, No. 11

CINCINNATI, OHIO

# We Present ---

- as the feature article in this month's issue "A Stove Builder Makes Bombs" a story of typical American ingenuity and how it is employed in the conversion from stove building to bomb manufacturing. The particular stove builder mentioned in this article is the American Stove Company, St. Louis, Missouri, which firm has interrupted its production of Magic Chef gas ranges to convert floor space, porcelaining ovens, pickling facilities, and other equipment to the fabrication of 500-lb. general purpose bombs. The article purposes to detail the salient features of the now refined A-S process of fabrication of this all-popular device of destruction, particularly because the technique has probably peacetime utility.
- on page 138—a description of Lockheed's new cafeteria and commissary—an employee-owned and employee-operated feeding system that has expanded into big business, providing a most satisfactory solution to the work-day meals problem. Illustrations show facilities for preparing, preserving, distributing, and serving the food.
- on page 162—an article in which A. S. Eves, Chief Field Engineer, Perfection Tool & Metal Heat Treating Company, Chicago, Illinois, discusses some of the phenomena that have resulted from the deepfreezing of hard and soft metals.
- on page 176—a very interesting article illustrating and explaining how a beam of light, properly harnessed, can be made to do the work of a safety guard, a starting or stopping lever, a temperature control instrument, a counter, or an inspector on quality or quantity, and do it better.
- on page 196—Noel Brindle's tenth article in the "Tooling the Automatic Screw Machine" series. Thread rolling, skiving, and shaving operations are discussed and the design of tools for performing such operations shown in this particular installment.
- on page 234 the design of a "ratchetless" ratchet wrench for hollow-head screws in out-of-the-way places; also, illustrations and explanations of other tools and devices which afford shop mechanics short-cuts to the performance of particular jobs. The usual "New Shop Equipment" section, cartoon, and other features follow.



Fig. 1—Spinning the Nose. After Spinner has Attained Working Speed, Operator Starts Robot, Which Oscillates as the Bomb is Rotated, Forming the Nose to the Proper Shape

# A Stove Builder Makes Bombs

A Story of Typical American Ingenuity and How It Was Employed in the Conversion from Stove Building to Bomb Manufacturing

By GERALD ELDRIDGE STEDMAN

TYPICALLY American, the culture of St. Louis, Missouri, is based upon the solidarity, distribution and balance of its industry. World-known for the excellence of its municipal opera, its 1700-acre Forest Park, more Boy Scouts per capita than any other city, its fine botanical gardens and the unusual proportion of its native-born white population, St. Louis symbolizes

the excellence of American free enterprise as the industrial, financial, and economic hub of the great Mississippi Valley.

Its 2500 industries produce 238 products and employ upwards of 126,000 men and women within its area. One of these industries is the American Stove Company, which interrupted its production of Magic Chef gas

ranges to convert floor space, porcelaining ovens, pickling facilities, and other equipment to the fabrication of 500-pound general purpose bombs.

American Stove Company knew little about forging—a prime operation in bomb manufacturing—but foraged quickly and well for steam hammer equipment for this job. Some of the hammers brought in had been stored in the open air since the last war; others were garnered from Oklahoma oil fields. Production began within five months after the government order was received, all this machinery having been rebuilt and placed in operation by green hands speedily trained.

This article purposes to detail the salient features of the now refined A-S process of fabrication of this all-popular device of destruction particularly because the technique has probably peacetime utility. Though American Stove Company has no after-war

intention along these lines, the equipment and the "know-how" which has been developed, com bined, offer a production opportunity for pressure vessels, containers for acetylene and oxygen, bottles for delivery of such lighter hydro - carbon gases as butane and propane, and so on.

Arthur Stockstrom, American

4

Fig. 2—Drilling Nose End of 500-Pound Bomb

Stove President, assembled this miscellaneous 1500-3500-pound steam hammer equipment from country-wide search, had his engineering department redesign and rig it, and started forging 500-pound bombs, nose and tail, by steam hammer technique.

A-S engineers had to drop the anvil blocks into pits to provide enough head room so that the bomb noses could be forged vertically, dropping the tails in the pits; performing as the only bomb producers in the country without special upset-forging equipment. And by that method 20,-000 bombs were produced while the company wrestled to obtain the equipment, install it, and standardize the rotary forging equipment procedure by which the nose is now spun. American Stove is still steam forging the tail . . . and vertically; a very neat job.

The A-S method of forging the tail by steam hammer is unconventional.





Fig. 3—The Bomb is Held Vertically while the Tail is Forged to Shape under a Steam Hammer

Usually, the anvil blocks on such hammers stick through the base and extend above. The A-S engineers assembled these old hammers on locations over insecure subfoundations, dropped the anvils completely through the bases and positioned them in pits below the hammers. Timbers were embedded in concrete, forming fortification up and down, right and left, front and back.

The principal difficulty consisted in that the hammers were too small, the throats were too shallow, and frames were too large. Everything seemed to cause predicament for the American Stove staff. Some machining was necessary on the hammers, but they were too cumbersome to be moved about to the machine tools. Accordinly, the tools were moved to the hammers. A shaper was turned on end and chained in position so that

it could be used to remove stock from the throat of each hammer. Steam was substituted for air at 100pound pressure to make the hammers operate faster.

The bombs thus made became very popular with the fliers. The earlier ones, with noses and fuses not built particularly to penetrate concrete, too often splattered ineffectually with little damaging penetrating power. So the 500-pound bomb nose was given more impact and penetration qualities, and American Stove began to shape them on rotary spinners described below and illustrated in Fig. 1.

Raw material for bomb fabrication is received in 30-foot lengths of seamless steel tubing, 14 inches O. D. with a wall thickness of % inch, cut to 51 inch rough bomb length on hy-

Fig. 4—Fixture Used to Locate Lugs for Tackwelding





Fig. 5—Bomb Lugs are Arc Welded in Position. This is a 500-Pound Bomb



start to provide proper elevation and negotiate a difficult turn to get the workpieces started off properly. This device brings the lengths of tubing across the road from the cutting station to a point inside the bomb building where they finally wind up in a hopper, from which they are roller conveyed to the initial forging furnaces.

The main steps in the work-flow are: (1) Heating nose for forging (a battery of two furnaces is maintained), (2) rotary spinning the nose, (3) drilling of the nose, (4) heating tail for forging, (5) forging of tail under steam hammer, (6) tack welding of lugs (American specifications require two lugs; British require one: as a result each bomb carries three). (7) arc welding of lugs, (8) heat treat and water quench, (9) final heat treat and air quench, (10) pickle, (11) lug test, (12) machining of nose and tail, (13) wash and dry, (14) paint, (15) ordnance inspection, (16) install ship-

draulically - operated A-S converted pipe threading machines. Con-veyors are largely of the gravity type through the entire operation flow, except for a Rube Goldberg contraption that has been rigged up at the flow

0rs

ry

er

It

00

t-

So

n

i-

to

e-

1.

n

1-

ıt



Fig. 6—Removing Basket of 500-Pound Bombs from the Pickling Bath



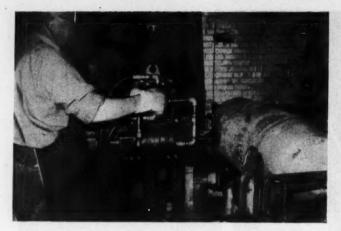


Fig. 7—Testing Hangers with Hydraulic Pull-Testing Machine

ary end-firing, from back-wall to front, producing a temperature demarcation line almost as perfect as in induction heating.

The furnaces are fired at 2300

the

Ba

Th

cal

by

wo

Tu

me

ing

bot

tat

"cc

cor

low

rot

slic

ar

ner

ope

or

th

ma

tat

the

Th

cha

sha

7

degrees F. Spare furnaces are constantly maintained on decks and dollies for replacement. A replacement can be made in about eight hours. Furnace life is now running 180 days. Control is by solenoid valve, thermocouple and Micromax. The firing interval is five minutes, and the work is served to the rotary spinners, 10 feet away, by gravity. A crew of four men comprises the forging detail, with two men operating the valve panel.

The rotary spinners used to forge

ping bands and pack, (17) bomb loading.

A-S forging furnaces are all of comparable size, two being maintained to heat the nose, and one to heat the tail. Firing chamber dimensions are: front to back wall, 24 inches; from bomb center to each side, 24 inches; hearth to roof, 48 inches. Bombs are backed 18 inches into the furnace mouth for firing, against a backstop chuck, three bombs being fired per furnace. Burners are of the high pressure type, using a 5-pound by-

pass, taking natural gas at 170 pounds pressure and reducing it to 30 pounds for firing through double-duty multiple ports. The flame is thrown over the work, differing from custom-



Ψ

128

Fig. 8—Loading 500-Pound Bomb into Machine for Nose and Tail Machining



tion being governed by a hydraulic cylinder which pushes the tool slide into contact with a cam which, in turn, controls the nose shape. The cam is of A-S redesign.

The angular displacement of the rotary

arm must be accurately controlled in the forging cycle, simultaneously advancing and retracting the unified movement of the main carriage, rotating arm and tool slide to provide proper displacement, action and cycle time to conform to forging dimensions. Close accuracy is assured by robot control, together with uniformity of product and the prevention of hazards that are always present in manual operation.

The operation of forging the GP 500-pound bomb presents quite a problem in that it is necessary to thicken the wall of the tubing as the ogive



the bomb noses were originally of Barney Machinery Company design. The original robot which automatically shapes the nose was designed by the Wheeling Steel Company. working in conjunction with National Tube Company. These pieces of equipment required considerable redesigning, particularly the robot. Two robots are maintained, work being rotated each five hours to provide proper "cool off." Essentially, each robot consists of three master parts, as follows: (1) a main table, carrying the rotating arm and tool slide. (2) a tool slide, which is cam-operated, and (3) a rotating arm.

The rotary forging spinner works the same when operated either manually or by robot, and involves three movements. The main table carries the rotating arm which carries the spinner roll support. The rotating arm is of changing length, like a shaper, the length of rota-



of I fall on

Fig. 10 — Using Air Grinder to Remove Surface Defects from Interior of Bomb

contour reaches its tangent point. There must be about a 45 per cent build-up of metal at this point, and inasmuch as it is difficult to push metal back that far, secondary heat is necessary. This heat is applied by the use of acetylene torches, the flames from which are played over the work to soften the metal and thus



Fig. 11—The bomb is Spray Painted while being Conveyed through the Paint Booth, at the same Time being Automatically Revolved

facilitate building it up at the proper point during the cycle. Similarly, water must be jetted onto the bomb nose at the proper forging time to prevent the heat that is developed in the spinning operation from melting the bomb nose away.

For processing, the work is held by a chuck which is operated by centrifugal action; closing, gripping, and revolving at a speed of 1140 r.p.m. with a surface travel of 3,600 feet per minute. The forging distance of the nose is 16 inches. At the tangent point of nine inches the metal thickens from 0.375 to 0.490 inch. After the spinning operation, the nose being closed, a 1¼-inch hole is drilled in the nose so that the bomb can be handled on conveying equipment.

The tail of the bomb is fired for forging at the same heat as the nose, and by similar furnace technique. Two 2,000-pound and one 3-500-pound steam hammers are maintained on this job. The bomb tail is forged vertically, the bomb being gripped in a huge chuck as shown in Fig. 3.

In the next operation, three lugs are tack welded at their corners and the workpiece proceeds to the welding bays for final arc welding, for which a Lincoln arc welder and Fleetwood No. 7 welding rod are used. The lugs have to stand a pull test in a specially-designed testing machine, hydraulically powered, consisting of a double action cylinder, hung from the ceiling and at the same time mounted on a toggle for manual operation. The machine provides a direct pull of 6,000 pounds. This test is applied, of course, after heat treatment.

The furnace used for the first heat treat operation is a continuous gas-fired, walking-beam, notch-railed, side-fired type with a chamber 40 feet long by 8 feet wide by 4 feet high with an arched roof and a hearth of double slotted rail design. The continuous delivery is accomplished by walking-beam construction which moves the bomb forward horizontally, one space at a time.

Six burners on each side of the first zone and five on the discharge side of the second zone fire over the work. The Micromax recording showed a beautifully straight line on this furnace temperature, indicating that such can really be obtained by direct firing methods. Scale-free character-





Fig. 12—In this Department the Bombs are Banded, then Given a Final Inspection for Workmanship

istics of the finished work likewise indicate good "time-temperature" balance.

As the work comes from the furnace, a 'see-saw" fixture delivers it to a 5 x 8 x 6-foot quench tank where it is quenched by water from rotary spinners, the water being re-used as a warm water bath in the later pickling sequence. A submerged nozzle in the quench tank flushes the interior of the bomb, providing agitation of the quench and adequate recirculation of the water.

Final heat treatment is accomplished by suspending the work vertically from a conveyor that carries it through a continuous gas-fired muffletype furnace that was rebuilt from an old porcelaining oven, the major rebuilding consideration being a lowered hearth. The work is suspended nose down. The dimensions of this furnace are: length, 60 feet; width, 24 inches; height, 56 inches. The primary heat is 1120 degrees F. for a 30-minute travel and 1100 degrees F. for a final 30-minute soak, the work coming out to be air-cooled to about 250 degrees F. after which it passes into a battery of five pickling baths for scale removal and final drying.

After pickling, the work passes to rough turning, finish machining, and tapping of the nose and tail. The lathes upon which the machining is done are of unique design in that the nose and tail are machined simultaneously. The lathes are of special A-S design, equipped with hydraulic heads of Midwest Piping and Supply Company design. The chucking mechanism consists primarily of two sliding rings mounted on the bed of the lathe. For the tapping operation the A-S engineers designed a floating tap holder in which the tap is fed by a positive lead screw.

Small metal protrusions, which might upset the firing characteristics of the bomb, are removed from the inner way by grinding with a small, unique grinding tool. The dimension between the operating trigger and the burling head is 30 inches, which is sufficient so that the operator can reach all parts of the inside of the bomb.

Each bomb receives a coat of paint which is sprayed on and as the bomb

Th

ref

Se

illu

tur

ad

op

tio

Ra

of

list

# SUPER SERVICE RADIAL

is the most accurate and easily handled Radial Drill we ever used . . .



refers to countless advantages derived from the Super Service Radial. In this important War Plant the Radial illustrated is used primarily for jobs on tools and fixtures where accuracy, speed and ease of handling are advantages of extreme value. Applied to many such operation—and more generally to quantity production—the numerous Cincinnati Bickford Super Service Radials in service today are proving their value as one of America's leading Tools for Victory. Bulletin R-21 A lists all features and gives complete details.



# THE CINCINNATI BICKFORD TOOL CO.

DAKLEY CINCINNATI OHIO US A

April, 1944

anship baths ying. es to , and The ng is t the ulta-A-S neads Comechaiding athe. A-S

tap

by a

hich

stics

the

mall.

nsion

1 the

h is

the

1944

MODERN MACHINE SHOP

133

travels into the spray booth, suspended by a cast iron lug that has been screwed into the nose, it is made to revolve automatically so that the spray can strike it from all sides. Mechanical revolution is accomplished by including a disc or wheel in the design of the holding device, so arranged that it is brought into contact with a moving leather belt. This is another of the so-called "Goldberg" devices, improvised to make the flow of production certain and fast. In fact, the bomb is processed from cutting shed conveyor to final loading in

box cars in exactly 472 minutes.

The American Stove methods and equipment described here all show that an engineering and tooling experience can be depended upon to develop ways and means for manufacturing products—where the management is determined to do the job. The rich experience that industry has had thrust upon it under the stress of war should be valuable as a peace-time asset in developing new products and new markets for the products thus developed.

# The New Wage and Hour Manual

Published by Bureau of National Affairs, Inc., Washington, D. C. Price, \$7.50.

With the issuance of the Economic Stabilization, Premium Pay, and Minimum Workweek Orders, a new chapter opened in Federal regulation of wages and hours. For the first time, a ceiling was placed upon wages and salaries; employers were restricted in the premium wages which they may pay for work on holidays or particular days of the week; and employers were directed to establish a minimum workweek. To effectuate these controls, a completely new set of rules and regulations was pyramided upon those previously established under the Wage and Hour Law.

A comprehensive guide to these controls is provided by the "1943 Wage and Hour Manual,", published by the Bureau of National Affairs, Inc. Included in the volume's 700 pages are more than 1,000 rulings and interpretations relating to wages, salaries, and hours of work. By means of frequent cross references and editors' notes, these rulings are correlated with others in both the new Manual and the 1942 edition of the same series.

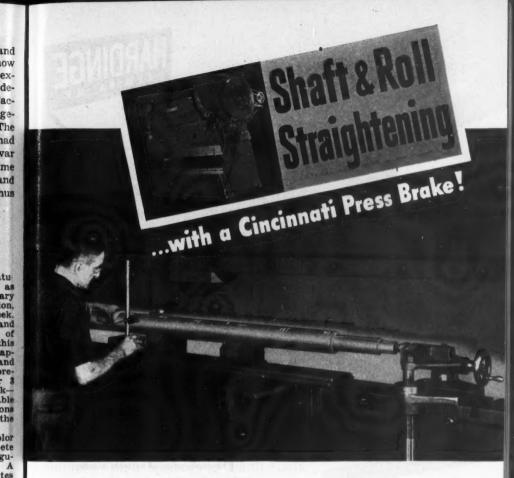
Following the general style of earlier editions, the 1943 Manual is divided into four principal parts. Part I includes all changes made since March, 1942, in controls under the Fair Labor Standards Act. Parts II and III contain similar material under the Public Contracts Act and a group of miscellaneous Federal statutes relating to wages and hours.

Part IV contains the text of all statutory and regulatory material, as well as analytical articles on wage and salary stabilization, premium pay regulation, and the minimum wartime workweek. The special guide to wartime wage and

The special guide to wartime wage and hour controls provided by Part IV of the Manual is an innovation with this year's edition. Divided into three chapters—Chapter I dealing with wage and salary stabilization, Chapter 2 with premium pay regulation, and Chapter 3 with the minimum wartime workweek—Part IV offers a readily understandable reference source both to the regulations themselves and to the policies of the administering agencies.

Printed on paper of a different color at the end of the Manual is complete topical index to all of the rulings, regulations, articles, and interpretations. A finding list of regulations and statutes in both the 1942 and 1943 editions is also included.

Chemical Publishing Company Technical Books Catalog. A new catalog of technical books has been issued by The Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. This catalog lists the latest books on chemistry, technology, physics, general science, mathematics, engineering, radio, aviation, formularies, metals, and so on Conforming with the requests of technical and scientific workers, the catalog gives the date of publication of each book as well as a concise description and full table of contents. Copy free.





tu

k-

lor

tes lso

niof by 26

ta-

ry,

ce, iaon. ni-

log ch on

ee.

244

Hardened shafts and rolls are quickly and accurately straightened on Cincinnati Press Brakes.

The set-up is simple and time saving—costs are materially reduced.

> Write for further information on Cincinnati Press Brakes.

# THE CINCINNATI SHAPER CO.

CINCINNATI OHIO U.S.A. SHAPERS SHEARS BRAKES



CAPACITY:

1/16 to 1" with collets

1" to 6" with step chucks

1" to 5" with jaw chucks

Spindle Speeds:

100 to 4000 r.p.m

high spindle speeds and ease of operation means better results under the close tolerances of manufacturing standards both today and in the days to come. The ease and simplicity of operation enables relatively unskilled operators to produce parts to the necessary close limits without expensive tooling

PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE

136

accui

Comp

Catal



In styles shown above for use on Milling Machines having Standardized Spindle End — also, in styles shown below for use on machines of old design

REPLACE worn, inaccurate cutter arbors with NEW Brown & Sharpe Arbors—strong and accurate—to enable you to get...

- Maximum production
- Accuracy of work
- · Full cutter life

Complete listing appears in Small Tools Catalog No. 34 —— sent upon request. We urge buying through the Distributor



For use with Taper-Nose Spindles

For use with Threaded Nose Spindles

BROWN & SHARPE



CAPACITY:

1/16" to 1" with collets
1" to 6" with step chucks
1" to 5" with jaw chucks
Spindle Speeds:

100 to 4000 r.p. m

high spindle speeds and ease of operation means better results under the close tolerances of manufacturing standards both today and in the days to come. The ease and simplicity of operation enables relatively unskilled operators to produce parts to the necessary close limits without expensive tooling

PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE

136

REPL

NEW

accur

Comp

Catal



In styles shown above for use on Milling Machines having Standardized Spindle End — also, in styles shown below for use on machines of old design

REPLACE worn, inaccurate cutter arbors with NEW Brown & Sharpe Arbors—strong and accurate—to enable you to get...

- Maximum production
- Accuracy of work
- Full cutter life

Complete listing appears in Small Tools Catalog No. 34 —— sent upon request. We urge buying through the Distributor



for use with Toper Nose Spindles

For use with Threaded-Nose Spindles

For use with T

BROWN & SHARPE



Gene Charles Birgy, Supervising Chel for the new Lockheed Employees' Recreation Club Commissary. "Charles" graduated from a Hotel School in Strassbourg, France, and has been with many Hotels, Restaurants and Clubs

An Employee-Owned and Employee-Operated Feeding System that has Expanded into Big Business, Providing a Most Satisfactory Solution to the Work-Day Meals Problem

By FRED M. BURT

# Lockheed Employees' New Cafeteria and Commissary

A T six o'clock on Monday morning, November 22, 1943, the Lockheed Employees' Recreation Club's new cafeteria was opened on a 24-hour daily schedule—and the key was thrown away.

Too seldom does an industrial plant, in full cooperation with its employees, meet the eating problem so boldly and on such a large scale. But the Lockheed Aircraft Corporation officials, agreeing with the employees' club that this was a problem of no mean proportions and that a solution was necessary, went the full length to supply that solution. As its contribution, the

Corporation built a 70,000-square foot cafeteria, with the necessary commissary buildings, and equipped it fully at a cost of more than \$500,000.

At eleven o'clock on the Monday morning referred to, in a brief ceremony on a platform in front of the building, President Robert E. Gross of Lockheed said, "All this is yours, to own, operate, and enjoy—with appreciation of everything you have done," as he presented the new commissary to the Club.

"In turning this modern hot-food plant over to the L. E. R. C.," he said, "we feel that we are placing it Main I Steam

in the whom eat m for m

front
wide of
design
riety
to the
novelt
and no
bills pa
orders
tained.

of the soft di The di

April, 19

Acre



Main Dining Room of Lockheed Employees' Recreation Club Commissary, Served by Six Lines of Steam Tables and Seating 1500 People at a Time. The \$500,000 Commissary Will Serve 60,000 Meals a Day and Provides Hot Food Service to 22 Canteens

in the hands where it belongs, and by whom it should be operated. Let's eat more—for an early victory and for more P-38's now!"

Extending the full length at the front of the building, except for the wide center door, are two malt bars designed for the dispensing of a variety of quick snacks. Inside, just to the right of the entrance, is a novelty shop where simple jewelry and notions may be purchased, utility bills paid, and travelers' checks, money orders, and amusement tickets obtained.

Across the way, in the front part of the huge dining room, is another soft drink, ice cream and snack bar. The dining room is equipped with colorful linoleum-topped tables, each seating four persons. To the right rear are four private dining rooms, each seating 44 persons, and one seating 88. Three of the smaller rooms and the larger one are equipped with folding doors which can be opened against the wall to make one large room with a total seating capacity of 220.

The fourth smaller dining room is used by Lockheed officials, when desired, but they get no more service than any other Lockheed employee; they have to select their own food and carry their own trays. The Lockheed president, vice presidents, and managers take their places in the line of employees which enters at the

S-

ot

is-

lly

ay

·e-

he

88

rs.

p-

ve

n-

od

he

it

244



One of the Six Lines of Steam Tables, Menus Offer Appetizing and Attractively.
Priced Hot and Cold
Dishes, and are
Changed Every Day

right side of the building, using a wide ramp and passing a change window where the folding money can be broken down into the necessary smaller change.

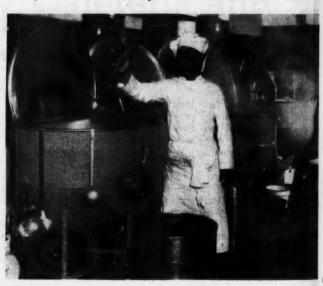
The wide entrance-way extends to the rear as far as the rear ends of the six food-service lanes, then turns

to the left at right angles. At this point, overhead, is a large menu board. The menu is changed daily.

The complete menu is served in the first five lanes. the sixth specializing in hot sandwiches, salads, desserts, and beverages. All six lanes are equipped with steam tables and refrig-

eration of the latest type. It is anticipated that, as soon as possible, plate warmers will be installed so that heat may be stored in the heavier china to keep food warm throughout the meal. At the forward ends of the food lanes are, of course, the customary cashiers.

Tray-cart combinations are used to



Battery of Steam Kettles which Operate like Double Boilers. Utilizing Steam rather than Boiling Water. The Kettles are used to Cook All Foods that Require Liquids; Soups, Gravies, and So On. Food Cannot Burn, the Flavor is Retained, and the Cookers may be Used to Hold Hot Foods until Served



diz-

ete

in

es.

al-

nd-

is.

evsix ip-

am

ig-

Ci-

ate

eat

to

al.

es

TS.

tò

# FINISHING TOUCH

### ... TO SPEED THE GOOD SHIP

HERE you see a ship's propeller blades being given a last-minute dressing—to add that fraction-of-aknot speed which may mean the performance of some vital war errand in the nick of time.

As on thousands of equally unusual sharpening, fitting or finishing jobs, a file is the tool used for the work. For, to assure the desired results under countless conditions, there is no substitute for the combination of human skill and The right file for the job.

With metals, alloys and other materials increasing in variety, the latter becomes a more and more important requisite—in ship-yard and plane factory, industrial plant and machine shop, tool room and repair shop, on oil, mining and farm equipment maintenance.

Nicholson and Black Diamond brands comprise literally thousands of kinds, cuts and sizes of files. Included are many special purpose files for such materials or operations as stainless steel, aluminum, brass, lead, plastics, foundry castings, die castings, die making, lathe filing, saw sharpening...plus a complete range of X.F. Swiss Pattern files for "precision" industries or departments, Guarantee: Twelve perfect files in every dozen.

## THIS 48-PAGE BOOK FREE

Invaluable to production and purchasing heads, shop feremen, machine and tool shop operators, master mechanies. Profusely illustrated, easily understood, high-lighted with information on kinds, use and care of files. Ferement book of its kind. Send for copies for the interested men in your organization. Address:

### NICHOLSON FILE CO., 48 Acorn St. Providence 1, R. I., U. S. A.

(Also Canadian Plant, Port Hope, Ont.)

NICHOLSON FILES WISA

944



Battery of Six Steam Pressure Cook ers used to Cook Vege-tables. One Baskst, such as That held by Arthur Megroz, Phili-pine Cook, Steams Enough Potatoes to Serve 200 People

convey used dishes and cutlery back to the dishwashing room, in which all containers of soiled utensils are unloaded onto a two-level transverse counter. Beyond it workers scrape off any remaining food and load the utensils into wooden containers some 18 inches square, which are fitted to receive all types of ware. Each holds, for instance, 16 platters or several dozens of silver.

The soiled ware is placed in one of two continuous-conveyor dishwashers about six feet long, where the pieces

are sprayed with boiling water containing a special cleaning compound, followed by complete envelopment in clouds of live steam. Thoroughly and antiseptically cleaned, the pieces slide out onto a large table

where any extra drying and polishing necessary is done by hand. Then they are placed in wall racks extending around three sides of the room.

Directly back of this room is a small room where coffee is made in two large urns for the cafeteria. In another part of the building coffee is made in the same way, in six of these urns, to serve outlying canteens. The coffee is transported to the canteens in large thermos jugs which keep it hot until served.

Also to the rear of the dishwash-



The Hiorth Bench Lothe has the speed, accuracy, handling ease, and dependability that appeals to every operator. That's why you'll find the better shops. equipping with the Hjorth Lathe.

> WRITE TODAY FOR DATA AND PRICES.

THE & TOOL CO., 12 BEACON ST., WOBURN, MASS



ith

ial m-

ed enin

ive ghtithe out ble ng ing

in

In is ese

The ens it

sh-

H

944

THE PAYROLL
DOLLAR
buys more



# ... WHEN "AMERICAN" MULTI-PRODUCTION LATHES ARE USED

ERE, for example, is an "American" in one of our most prominent shops actually producing four (4) times more work than the fairly modern machine it replaced. In hundreds of plants "American" Multi-Production Lathes are lightening the burden of higher wages, shorter hours, increased taxes and inexperienced operators. That is why "Americans" are the choice of cost-minded production men. The many productive features responsible for such results are clearly illustrated and described by our new bulletin No. 445

# THE AMERICAN TOOL WORKS COMPANY

LATHES . RADIALS . SHAPERS CINCINNATI, OHIO, U. S. A.

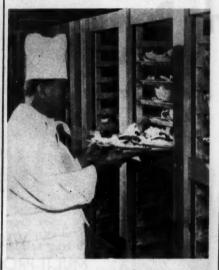
# Machined Jobs\* are NOT Complete without DY-NAMIC BALANCING

Rotating Parts must be Dy-Namically Balanced, if they are to be free from the destructive couple-force vibrations that cause premature wear, reduced efficiency, and increased maintenance cost.

Now Dy-Namic Balancing has been made easier, faster, lower-cost—due to the new Bear Dy-Namic Balancing techniques and low-cost machines. Leading Manufacturers employing Bear Precision Dy-Namic Balancing report accuracy to Government specifications resulting in smoothness and efficiency impossible with products that are not in Dy-Namic Balance.



ing room is the large salad room where salads are made up in a large variety, placed on plates, and stored in one side of a huge refrigerator until serving time. The refrigerator has 24 compartments, with doors on each side so that the salads can be put in at the rear and taken out at the front, the refrigerator facing on a main aisle leading to the service tables. Thus all space in the salad room is kept clear



Over 4,000 Salads a Day can be Prepared in the Specially-Designed Salad Kitchen. Washing Sinks, Slicers, Grinders, and Work Tables are Conveniently Placed. Salads Placed in the 41-Degree Salad Refrigerator Never Lose their Freshness

for those who are detailed to the salad-making.

The salad room, for which 15 people are necessary, is equipped with a power mixer and chopper and refrigerator storage for raw materials. Each of the 48 doors behind which the salads are stacked on trays is labeled.

Still farther to the rear is a large bakery, for which another 15 people are required. Here are two big rotating ovens, two power dough-mixers, steam kettles, refrigerator, a prove-

Apr

# 40 FLOATING HOLDERS and what they do\*

om

rge red un-

nas ich in

nt.

sle

all

ar

ne

0-

S.

ie

d.

le

What Gairing Floating Holders do for Wright is indicated below . . . what they always do when given an opportunity is a story that every machine tool production man and every operator should know and understand.

And that's easy, for if you understand the action of a universal joint, you will understand the action of a Gairing Full Floating Holder.

All of which means that when a self-contained fixture holding the work is set, the cutting tool held by a Gairing Full Floating Holder can't go wrong regardless of any misalignment with the machine spindle. It can't go wrong because the universal joint action eliminates side strain or any urge to one side of the bushing. The net result is that accuracy is maintained.

Gairing Floating Holders are quickly applied to any spindle, take cutting tools just as quickly. To ignore their value is a net loss.



\*Forty Gairing Full Floating Holders, equipped with the necessary cutting tools, drill and ream twenty holes in the cylinder barrel flanges of Wright Aircraft Engines. The machine is equipped with an automatic five position index.

# GAIRING

The Gairing Tool Company, Detroit 32, Mich.

Manufacturers of Standard, Special and
Gair-Lock Inserted Blade Cutting Tools



Removing Freshly-Baked Cherry Ples from one of the Huge Rotary Ovens. Giant Mixers prepare the Dough or Batter and Two of these Rotary Ovens are kept busy "Turning Them Out."

box for rising, and a doughnut machine with a capacity of 1440 doughnuts per hour. Bread is purchased from commercial bakeries, but all other baked goods are made here. At the time of the visit by the writer, some very delicious Christmas fruitcakes were slowly revolving in the huge oven.

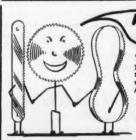
On this side of the building, also, is the sandwich preparation room where a staff of some 15 people is busy turning out the thousands of cold sandwiches that are required every day.

Between the salad room and the bake shop is an area with an outside door where the porcelain enamel-lined and heavily insulated 10-gallon food containers that are used for canteen service are washed and sterilized along with other kitchen utensils. After be-

ing washed, the containers are filled and taken to the rear of the building for loading in canteen trucks.

All hot food is prepared in a large center room back of the wall at the rear of the service lanes. This room is equipped with a battery of 16 ranges with four double roasting ovens, four fry-kettles, two roastwarmers to keep meat hot between carvings, and two "bain marie" fixtures for keeping cooked foods hot.

There are also 14 soup kettles in 100, 80, and 60-gallon sizes, which are also used for preparation of stews and gravies, and 12 vegetable pressure cookers designed for the retention, in



# WE SAW 6 TIMES LONGER

You can extend the life of your hack, band, or slitting saws six times if you sharpen them on a Howe-Lindsey Automatic Saw Sharpener.

Write for Folder

HOWE & SON, INC.



Sou

and

S P E C I F I C A T I O N S

Swing over bed A T I O N S

Thread cutting feeds (48)

Spindle speeds 4 to 224 per inch

and cross feeds 48

# SOUTH BEND TOOLROOM LATHES

for Precision Machine Work



TRAINING HELPS

Sound films, books, wall charts, and bulletins are available for training lathe operators. Write for Bulletin 21-C. Skilled craftsmanship combined with excellent design in South Bend Toolroom Lathes make them highly efficient for machining work to precision limits.

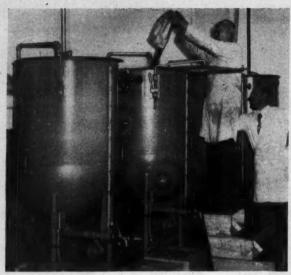
Their accuracy, speed, and smooth power assure fine finishes. Wide ranges of turning and facing power feeds, thread cutting feeds, and spindle speeds, plus ease of operation, help to simplify the exacting jobs.

South Bend Toolroom Lathes and Engine Lathes are made with 9", 10", 13", 14½", and 16" swings. South Bend Precision Turret Lathes are made with 9" and 10" swings. Write for Catalog 100-C.



ì

SOUTH BEND LATHE WORKS



Each of these Six Giant "Coffee Pots" makes 6,500 Cups of Coffee. The Water is Boiled by Steam, and the Coffee is held in Cotton Flannel Sacks in the Boiling Water

the preparation of vegetables, of the maximum of vitamin, calory, and savory values. Added to this equipment are two man-high power mixers for mashing potatoes, turnips, and other vegetables that must be prepared in this manner. To the rear of these is the great kitchen refrigerator and dairy ice refrigerator, adjacent to which is Supervising Chef Charles Birgy's office.

At the right of the large kitchen, beyond a glass partition, is the meat preparation room with its power saws, grinders, chopper and slicer. After the meats have been properly cut, chopped, sliced, or rolled, they are put into an adjacent cold storage room until serving time. Also adjacent to the kitchen is a fish refrigerator room where, although the room is maintained at a low, controlled temperature, all fresh fish are kept in a pack of

chipped ice in four large concrete vats. According to Chef Birgy, this is the only correct way to keep fish so that the quality of freshness and flavor will be unimpaired.

To the right of these rooms is a large meat storage room in which the temperature is thermostatically controlled. Extending the length of the room are six overhead tracks from which, on hooks attached to rollers on the tracks, quarters of beef and pork, and other large pieces of fresh meat are suspended. This room serves both as a meat storage and

# ILLUMINATED BORE MICROSCOPE

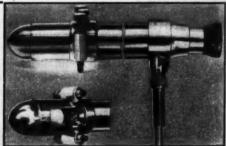
The LENOX Bore Microscope (50 power) illustrated is used in the inspection of engine cylinders plated by the Van de Horst Porous Chrome process.

Chrome process.

LENOX Borescopes widely used in the inspection of gun barrels, turbine rotors, hollow shafts, tubes, well drill pipe, the hundreds of industries dark cavities are usually 2-3 power. Send us your problem—give inside diameter and length of hole to be explored.

# LENOX INSTRUMENT CO.

2010 CHANCELLOR ST., PHILADELPHIA 3, PA.



FACTOR'S THAT ARE IMPORTANT

# BROACH EFFICIENCY!

ACCURACY IN DESIGN

PRECISE GRINDING



CORRECT HEAT

PRECISION TOOLS



Ground Hobs



Milling Cutter

Cutters



Ground Form Tool



Broaches

pecial Teels . . Geer Measuring Machines . . . Die Filing Machines A broach is a precision tool which requires unusual skill and experience in design plus a special proficiency in manufacturing.

To assure an exceptionally high degree of performance — both in the accuracy of the parts broached and, long life for the broach itself — we suggest that you discuss your next broaching job with an "Illinois Tool" engineer. If you have such a problem now, send us complete details.

OVERNMENT TO ALL AMERICA ... FROM THE NUO OF AIR TRANSPORTATION

# ILLINOIS

TOOL WORKS

In Canada Canada Illinois Tools, Ltd. Toronto, Ontario

MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS

for the purpose of ageing the beef. All of the meat is of the best grade according to Government standards, and most of it is purchased by an expert who is charged with this task.

The overhead tracks are supplied from an extension which runs out to the unloading dock, and are emptied from another extension which runs

into the preparation room.

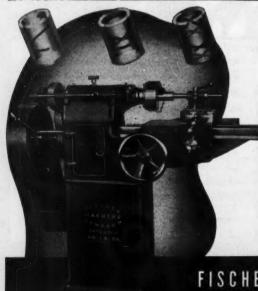
Back of the meat department is the vegetable preparation room, equipment for which includes two electric potato peelers, each of which can handle a 50-pound load in about two minutes. To the right of this room is a potato and onion storage and a cold storage room containing large quantities and varieties of fresh vegetables. In the rear of the kitchen refrigerator and across the aisle is the entrance to the large grocery wareroom, which has its own office to keep track of receipt and disbursement records. Here are great stacks

of boxes, cartons and bags containing fruits, crackers, soft drinks, sugar, flour, condiments, and other items of staple groceries.

A large outside door leads to the unloading dock, and an inside door leads to the room where canteen service units, such as vending machines, are serviced. In the front right corner of the wareroom are the small offices comprising the timekeeping department for the 525 employees, and the offices of the receiving clerk and purchasing agent.

Also to the rear of the kitchen refrigerator is the bread storage room, the linen room, and the clearing house to and from the laundry where the uniforms, towels, aprons, and so on are consigned and received. The last room in this row is the office of the dispatcher, who controls the movements of food supplies to the 22 outside canteens.

At the rear of the building is a



# FISCHER Oil Groovers

A wide variety of grooves may be cut on the "FISCHER"... with minimum set-up time and cost.

Bearing in which groove is to be cut is mounted on revolving chuck secured on work spindle. Boring tool is secured to carriage slide which has a reciprocating motion timed with work spindle and lined by crank gear and connecting rod.

Several attachments can be furnished for cutting practically any type of oil groove.

Capacity of No. 1 Machine — 5" dia. . . . No. 2 Machine—15" dia.

PROMPT DELIVERIES
Write for catalog.

FISCHER MACHINE CO

310-16 N. ELEVENTH ST.

PHILADELPHIA PA

WHAT WAS THAT WE THAT JUST WENT BY? NOT A FOUR SENERAL LOAD OF BUT ANOTHER WAR EQUIPMENT THAT WAS PUT TOGETHER ST N RECORD TIME SINCE +++ THAT FAST-DRIVING RECESSED HEAD

SCREW C ON THE JOB .. IT'S PHILLIPS



Sure - the news is swell! But the war isn't over yet. The heat's still on - and production speed is as viral as ever.

One of the surest ways to get more speed in your assembly operations is to put Phillips Recessed Head Screws in the hands of your workers. Hundreds of plants all over the country have standardized on the Phillips screw - and the results have been spectacular. Driving speed has

often been doubled. Vital man hours have been saved. Production has been greatly increased - thanks to the Phillips Recess which makes power or spiral driving practical.

Some advantages of Phillips Recessed Head Screws are listed here. Check them against slotted head screws - or any other type you may be using. You'll quickly see why it costs less to use screws with the Phillips Recessed Head.

### TO MAKE WARTING QUOTAS AND PEACETIME PROFITS

usser Driving: Spiral and

Series Festionings Screws are set-up uniformly tight, with-out burning or breaking of screw heads. The job is stronger, and the ornamental recess adds to appearance.











large open room and an expediting dock where the eight hot-cold, fast, heavily-insulated trucks are loaded. Each truck is divided into two compartments, one for hot and the other for cold foods. It is estimated that these trucks will travel over 336,000 miles a year and will carry 60 per cent of the commissary's output, the remaining 40 per cent being served in the central cafeteria.

This delivery service is maintained to all the outlying Lockheed branches, including plant A (until recently the Vega factory) and the four food service centers in the main Lockheed plant nearby. It is really a big business, when it is considered that food service is made available to nearly 100,000 people.

At the front of the building, extending from side to side, is a mezzanine with offices for the accounting department, comptroller, and commissary manager, and for the necessary routine clerical work. These offices open on a passageway with glass windows overlooking the big dining room.

Except for the linoleum-covered dining room floor and other areas forward of the working and service departments, the cement floors have been laid with slight slopes for drainage. All the walls and ceiling are coated with water- and steam-proof paint, and the walls are washed down at regular intervals from conveniently-located outlets. The 70,000 square feet of wall fairly gleam with sanitary cleanliness.

On the top of the building big ventilators, more than 10 feet high, supply fresh air for the warm-weather, forced ventilation. In cooler weather steam heat maintains a comfortable temperature.

The cafeteria and commissary are operated under the supervision of Chef Charles Birgy, whose French training has been augmented by experience in Europe, Canada, Chicago,

WORCESTER 4 MASSACHUSETTS U. S. A



BEHIND the scenes . . . . . "Greenfield" screw thread engineers look over each order for "Greenfield" Taps.

They are "top tailors" extraordinary!

If you merely want a "ready-made" tap of a certain size - you will automatically get the benefit of refinements in design worked out by these "Greenfield" engineers.

But if you give them more information - as to the "fit" desired, as to the material to be tapped, as to operating speeds, etc., then these men can be of extra service in tailoring a tap to fit your needs.

"Greenfield's" engineering staff is large and highly trained. They are continually enlarging the frontiers of screw thread knowledge as a result of more than 70 years of research in Greenfield.



\* Have you copies of our new booklet "Selecting the Right Tap For the Job" which summarizes the data needed in ordering taps?



GREENFIELD TAP AND DIE CORPORATION . GREENFIELD, MASS., U.S.A.



Eight of these Trucks are used to Carry Hot and Cold Foods to 22 Lockheed Canteens at Outlying Plants and to Far Corners of the Main Plant. Food is Served at the Canteens on Plastic Plates; Coffee in Paper Cups; Sandwiches are Wrapped in Waxed Paper

and California before coming to Lockheed. The total daily output averages 9,000 complete hot meals at the central cafeteria, and 3,500 at the canteens, plus all the short orders, cold sandwiches, and other food and drink.

The L.E.R.C. canteen system was started with the cooperation of Lockheed management when the L.E.R.C. officers pointed out that the monies raised by the sale of dance tickets, picnics, and other social activities fell short of the amount needed to carry out certain employee service activities. Once convinced that the L.E.R.C. could conduct its affairs in a business-like manner, the management was quick to lend every assistance to the



# BAND SAW WELDERS

No. 141 may be had without grinder or with grinder for removing flash. Has 6 point heat control, one for annealing weld.

Welds saws 3/4" wide and smaller.

110 volt 60 cycle single phase. Can be made in 220 volt.

Send for catalog.

WELDEX INC.

7327 McDonald Ave.

du

mi



## **ENGINEERED LIVE CENTERS**

A properly designed Live Center is one of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job gets set up with the right Live Center. Standard shanks with Morse taper carried in stock.

STURDIMATIC 1222 THIRD AVE

TOOL COMPANY
1222 THIRD AVENUE, DETROIT, MICHIGAN
LIUE CENTERS

establishing of a canteen.

The first canteen was set up in a small structure and in the first year of its operation netted about \$500 per month for the L.E.R.C. More outlets were set up and during the year ending September 30, 1943, these small sales operations alone netted the L.E.R.C. \$86,000 from a gross of slightly over one million dollars. There is no profiteering, and employees can purchase from the canteens as cheaply as anywhere else.

Analyzing this record, the L.E.R.C. and the management concluded that an efficiently-operated cafeteria-commissary would not only afford a greater net return but would, in all probability, draw a certain amount of business which had been going elsewhere. When it was decided to go ahead, the assistance of a well-known commissary supply company was secured to aid in the planning.

It has been a broad and daring ven-

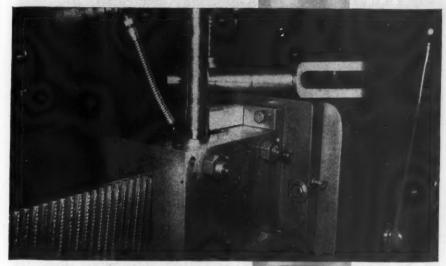
ture, but it is a success from every angle-and it is owned and operated by the employees through their club. It should be considered that there is no one employee welfare problem of greater importance than the problem of making good, well-prepared food conveniently available at economical prices. A happy solution to this problem will do much to combat absenteeism, terminations, and low employee morale. People work more happily and efficiently when properly fed. And in these days when often there is no one at home to shop and prepare meals, this is an important item.

An analysis of a representative menu shows that for from 35c to 60c, a meal containing 1200 to 1600 calories of well-balanced food may be obtained. Most people need only from 2,000 to 3,000 calories in food for an entire day.

Again, one of the most important factors in good management-employee



## Split Thousandths



This is a story of production, a story which is more than merely adequately handling a difficult job. It's typical of broaching's part in precision production.

The part shown is a Steel Spar Terminal. The job — to make more parts per hour with less tolerance than was ever thought possible before the war. The answer — a 3L Horizontal Hydraulic Broaching Machine with special broach which with a special fixture made production and precision a matter of seconds rather than hours—a matter of split thousandths rather than thousandths.





relations is the conversion of employee attitude from "cussing out" the eating facilities to praising them. When owned and operated by the employees, the company is relieved of responsibility and the employees have the power to correct unpleasant or unhappy conditions.



#### New Plant of Gray-Mills Company

The Gray-Mills Company, pioneer manufacturers of portable coolant systems for the metal working industries, have moved from their previous quarters at 215 West Ontario Street, Chicago, to a new plant at 1948-52 Ridge Avenue, Evanston, Illi-

nois. The new home, a two-story structure containing 50,000 square feet of floor space, more than doubles the space now in use for manufacturing, warehousing, and by the engineering and office personnel. The company has also acquired adjacent property to assure increased capacity in the future.



STAGES IN THE GRINDING OF A SOSSNER

### OCTUPLE THREAD TAP

(8 STARTS)

A top that calls for the highest degree of tap-making skill. Each start must be precisely indexed and then precision ground for perfect size,

lead and thread spacing on the finished tap.



TAPS GAGES CUTTING TOOLS STEEL S

SOSSNER

Step 8

FINISHED TAP

161 Grand St., New York City 13, or 27 Broadway, Lynbrook, N. Y.

Step 6



of lubricating greases? . . . . Do you know the different grease types . . . their virtues . . . their weaknesses? . . . . Are you informed about proper selection and correct application?

This and other information, vital to every industry, is contained in "Lubricating Greases," a new Sinclair brochure published by America's outstanding manufacturer of lubricants.

"Lubricating Greases" by text and chart furnishes you with facts essential to higher production and lower upkeep in individual machine or complete plant operation.

. If you are interested in more efficient, more economical lubrication with a greatly reduced inventory of greases you will want a copy of "Lubricating Greases." Write today for a copy—with our compliments.

### SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.



#### HASKINS FLEXIBLE SHAFT UNITS ARE BUILT FOR SERVICE

They'll stand continuous hour after hour use—three shifts a day—seven days a week. They'll turn out more work—better work—faster and easier, with longer trouble-free operation. Use your Haskins Flexible Shaft Machines—use them hard. They won't let you down. Learn new ways of increasing production with flexible shaft equipment from Catalog 45. Write to R.G. Haskins Company, 619 So. California Ave., Chicago, Illinois.



Flexible Shakt

ore VERSATILE Machines for More PROFITABLE Work

## Yes-Deepfreezing Helps

In Which the Author Discusses Some of the Phenomena That Have Resulted from This Treatment

By A. S. EVES

Chief Field Engineer, Perfection Tool & Metal Heat Treating Company Chicago, Illinois

DESPITE the increasing use and popularity of deepfreezing, there still remains much to be learned regarding its effect upon metals, hard or soft. So far I have neither read nor heard any elaborate statements of details which would tell what takes place among the atoms of a tool, for example, when it is refrigerated to say 120 deg. F. below zero and then is permitted to return to room temperature.

Nevertheless, it is not too early to discuss some of the practical results which are being achieved by such treatment. For these results show clearly that if the process is applied intelligently it certainly does no harm, while in hundreds of instances it has greatly improved the efficiency and wearing quality of a wide variety of tools and mechanical parts.

Perhaps the first practical use to which such refrigeration was put was for shrink-fitting. For this purpose, dry ice and liquid air have been used for years. Here we find little to explain, since everyone knows that steel decreases in size when chilled.

Almost as long ago the discovery was made that freezing resulted in dimensional stabilization. In an in-

teresting chat with a local manufactureer of apparatus for measuring atoms—an early pioneer in precision work—I learned that some six years ago he had visited a large tool-making plant in the East. Passing through a yard where lay thousands of castings, he was told that those would be permitted to stay outdoors for three or four years because, "During all that time we are bound to have at least one really cold spell."

That remark clicked, and set my friend's mental wheels in motion. When he returned home he experimented with three lots of grey iron castings. Two of these lots he aged thoroughly in different ways according to heat-treating practices. The third lot he chilled with liquid air. Then one very cold winter night he laid them out in his yard. Next day, careful measuring disclosed that the only castings which had not "moved" were those he had sub-zero treated.

Nowadays, literally hundreds of manufacturers of gages, arbors, and precision machined parts have found that deepfreezing after hardening, prevents those subsequent changes in size and shape that turn men's hair prematurely gray. Sometimes such

162



### TRU-THREAD DIAMOND TOOL ECONOMY



DIAMOND TOOLS are available for forming the wheels that grind ACME, BUTTRESS, U.S.S., WHITWORTH and any spe-cial form, groove or standard thread.

Look at the cost records of production jobs wherever Tru-Thread Diamond Dressing Tools are at work and you'll see ECONOMY you never before thought possible. Here's an example-from the shop of a large nationally known manufacturer:

"Although our Tru-Thread tools cost only one-half what we have been paying for previous tools on this job, the Tru-Thread tools have thus far run more than twice the average number of pieces we ordinarily got from our previous tools, and they are still in use with no evidence of an immediate breakdown."

That letter is typical of many in the files of Wheel Trueing Tool Company-letters that speak of economy in terms of more work, faster work, cleaner cuts, longer holding forms, fewer required dressings and less down time. Write, wire or phone for further information today!

### WHEEL TRUEING TOOL COMPANY

3200 W. Davison Ave.

Detroit 6, Michigan

S

h

d

r

3

V

d

e

e

e

f

d

n

r

pieces shrink dimensionally in freezing, and remain shrunk permanently; they may, on the contrary, enlarge permanently. But from then on there seems to be an absolute stability.

Photomicroscopic examinations do not tell us just what happens within the steel, but we do know definitely that something does occur. The theory of strain relieving seems the nearest answer: but that explanation may some day be proved to be incomplete.

The manager of a screw machine house tells of a lot of trouble he had in tapping SAE 4340 parts. The taps broke, and the material tore. It may have been a little too soft for good working-that sometimes is the case. Anyway, he deepfroze the hardened taps, and discovered that there was some improvement. Then he decided to try deepfreezing the soft parts Strange as it may seem, this combination broke the jam and the job proceeded smoothly to the end.

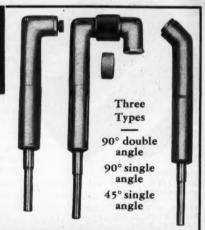
Valuable as sub-zero treatment has long proven for shrink fits and for neutralizing, some years passed before anyone noticed that heat-treated tools and parts which were deepfrozen often took on additional hardness. This without increase in brittleness: actually, some increase in ductility is claimed. Tools so treated performed better on many different jobs. This, metallurgists agreed, was due to conversion of retained austenite. In other words, they began to see that the effect of intense cold was similar in nature to that of intense heat. The wonder is that this fact took so long to register. After all, when we were kids, how many of us have daringly tried touching a frosty door knob with finger or tongue. And the result was-a blister!

For clarity at this point, let me emphasize in a very elementary way that heat-treating for hardness is accomplished by heating the metal to

### **Invincible Sky Tools** Wear Better — Last Longer

Invincible Angle Drill Attachments reach "hard-to-get" spots, saving time and expense for you. Ouickly and easily installed and serviced on the job. Patented thrust ball takes the wear instead of gears. Check Invincible today!

Stock Deliveries



The Ball Wears not the Gears! INVINCIBLE TOOL COMPANY

Angle Tool Attachment Manufacturers

6111 EMPIRE BUILDING, PITTSBURGH 22, PA.

## KEEPCUUL



### **USE COOLANTS LIBERALLY**

eed

crto In at ar ne ng re lv do ene ly is to

44

Prevent overheating of tools which causes heat checks and premature tool failures.

Don't let work get hot and difficult to handle.

Heat distortion makes accuracy difficult to maintain.

Mere trickles aren't enough. When using any coolant, flood the tool and the work for best results.



Reproductions of this page on enameled paper are available in 81/4" x 101/2" size for bulletin-board use in Sur turret lathe department. Write the Gisholt Machine Company, 1219 East Washington Avenue, Madison, Wisconsin. Ask for the series of "Wartime Care and Operation Posters." State quantity desired.



### STANDARD REAMERS

available from stock

R EAMERS and many other cutting tools, formerly in the "special" class are now STANDARD with us. The majority of these STANDARD cutters is in stock most of the time. Our broad line often enables the consolidation of tool orders and saving of valuable time. Each W-S tool is tipped with the correct grade of carbide best suited to do a cutting job on the metals for which the tool was ordered. Carbide tipped tools are not just a specialty with us . . . we make them exclusively. You can expect and get uniform, high quality results with W-S tools. All shanks hardened at no extra cost. Write for new FREE Catalog 144 and latest prices. WENDT-SONIS COMPANY, HANNIBAL, MO. Branch Warehouse: Long Beach, Calif.

SAVETIME... wire or phone your requirements!

W-S Carbide Tipped Core Drills available in straight and tapered shanks. Sizes: 1/2 to 11/2

W-S Carbide Tipped Centers available in Morse, Browne's Sharpe and Jarno Tapers.

CARBIDE TIPPED CUTTING TOOLS Reamers • Centers • Core Drills • Counterbores • Tool Bits • Spot Facers • End Mills • Hollow Mills • Roller Turning Tools **Boring Tools • Special Tools** 

a point where a chemical change occurs. Austenite is changed into martensite: whereupon by sudden quenching it becomes fixed. It is a wellknown fact that, by hardening and drawing in the ordinary way, such transformation never is 100 per cent complete. This is because the cooling stops at room temperature.

It now is known that by carrying the metal on down to minus 120 deg. F. and holding it there a while, then letting it come back to room temperature, the transformation is roughly within two or three per cent of completion. Naturally this gain is reflected in hardness readings of one or several points, depending upon the kind and condition of the steel. But that is not all that is gained, for we have seen cutting tools which did not increase in hardness show improved working and lasting qualities: most interesting in times like these when we want every tool to accomplish its utmost and last as long as possible.

I am keenly aware that when one tries to prove such improvement in tool quality and life without even the support of microstructure evidence. he is treading on dangerous ground. Too often some unconsidered factor enters into such a test. But the proof of the pudding lies in the eating; and the number of reports of such improvement is constantly increasing with the greater use of the deepfreeeze method. In a few months I am certain they will constitute a veritable mountain of proof that will be big enough to speak for itself.

Meantime, here are a few examples taken out of our own daily experience with deepfreezing various jobs.

We have in our shop a highly repetitive job of carburizing gears made from SAE 2512 steel. The specifications call for 60 Rockwell C. scale, which ordinarily is easy to attain. But any nickel bearing (or chrome bearing) steel is more subject to re-

MODERN MACHINE SHOP

April, 1944

M

In

ha

me

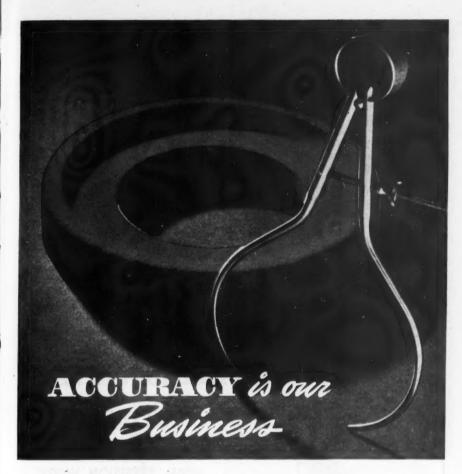
Ur

siv wh

ou

T)

Apri



Meeting the stern demands of War Industries, Nubon grinding wheels have earned unqualified endorsement for Accuracy and Uniformity.

Uniformity is achieved by our exclusive Controlled Trial Plan of engineering which puts the precision and speed of our facilities at your instant command.

Numer Numer

**Production time is slashed** by our special bonding process. Speedy tenday delivery guaranteed — even faster service in an emergency.

Send for your copy of our catalog, today.

### UNIVERSAL WHEEL & ABRASIVE CORP.

2630 VAN BUREN STREET, CHICAGO 12, ILLINOIS



hllnd ch nt

ng g. en aly neor he ut ve ot ed st en ts le. ne in

he ee, d. or of nd m-ng p-

r-

be

es

ce

e-

rs :i-

le, n.

ne

e-

tention of austenite than is a straight carbon steel, and occasionally we run into a lot in which heat treatment fails to produce a hardness of more than 56-57. Twice within a month we have subjected such "failures" to the deepfreeze treatment, and in both instances the hardness was raised to 64 Rockwell C.

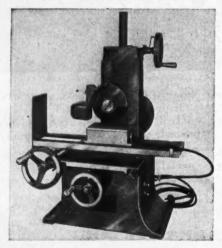
On the other hand, we had two ½ x 1-inch moly high speed tool bits which read 65 Rockwell C. but which did not work properly. They also felt rather odd under a file. When these tools were deepfrozen, they were no harder, but the condition—whatever it was—cleared up and the tools worked better than any the customer had ever used on that job.

A manufacturer of roll grinding and corrugating machinery recently sent us several corrugating tools made from Sanderson Double Special steel. These tools are used to cut grooves in chilled rolls, and must be as hard as possible. We hardened and drew the tools, whereupon they read 67-68 Rockwell C. That was the best we could do, and yet when deepfrozen, these tools went a full point higher. It seems perfectly obvious that they are bound to prove tops for a job like that.

It begins to look as though anything that is hardened can be improved by deepfreezing. Preferably, however, the freezing should be part of the heat-treating cycle, since austenite tends to stagnate and conversion to martensite is not so readily achieved as time elapses.

I shall not go into the many peculiar things that deepfreezing is bringing to light, except to cite two reports from outside our own plant. In one case, alloy steel bars which went eliptical in heat treating returned when deepfrozen to their original round cross section. In another instance, a broken high speed milling cutter

## Sanford Precision Bench Surface



## Grinder

A HIGH SPEED GRINDER FOR ALL SMALL PRECISION WORK

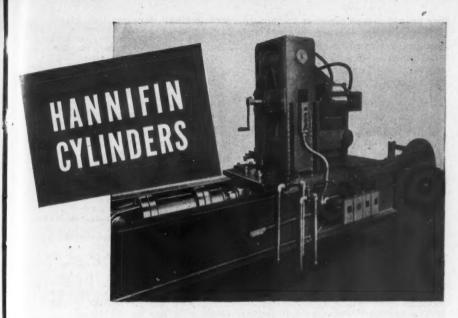
Write for Specifications
Bulletin No. CM
Dealer Inquiries Invited

PROMPT DELIVERY

SANFORD MFG. CO. 1279-81 SPRINGFIELD AVE. IRVINGTON 11, N. J. aluncient
with
a Ha
ing
hydr
cylin
mou
vidin
The

61/4 1

strok



### used on the Medart Stretcher-Leveler

Stretch straightening of strip brass or aluminum is handled rapidly and efficiently on the Medart Stretcher-Leveler, with the clamping action provided with a Hannifin air cylinder and the stretching pressure applied with a Hannifin hydraulic cylinder. The clamping air cylinder is a 12 inch Model BR clevis mounting type with 6 inch stroke, providing smooth, powerful clamping action. The stretching action is provided by a 6½ inch hydraulic cylinder, 12 inch stroke, with cushioned head end, de-

signed for 2000 lbs. working pressure.

Hannifin cylinders are precision built.

Hannifin cylinders are precision built, to match modern machine tool design. Cylinders are bored and honed, to provide a smooth, precision cylinder interior for efficient piston fit and maximum power.

Write for cylinder bulletin 62-MM, giving compact tables of both pneumatic and hydraulic cylinder dimensions.

HANNIFIN MANUFACTURING COMPANY 621-631 South Kolmar Ave. \* Chicago 24, Illinois

HANNIFIN

Pneumatic-Hydraulic

CYLINDERS

he 68 we en, er.

ey

ymly, rt ıserilv uge-In nt ed nd ce, er was brazed and softened at the break; but upon being sub-zero treated the hardness returned to normal, and the cutter was used with success. There probably will be many more surprises come out of this new treatment.

#### ASA Machine Tool Standards Revisions

The American Standards Association has announced the revision of two in the series of 20 machine tool standards; namely, B5.7-1943, Circular and Dovetail Forming Tool Blanks, and B5.10-1943, Machine Tapers (Self-Holding and Steep

Taper Series).

The standard covering circular and dovetail tool blanks and their holders, first approved in 1936, was necessitated by the need for interchangeability of circular and dovetail tools manufactured for use on various makes of screw machines. Since then, the Committee has decided to add standards for the holding elements. The revised standard includes besides the sizes and types of circular

and dovetail forming tool blanks, the associated mounting portions of their respective holders for use on automatic screw machines. To provide for interchangeability and reduce the number of blanks now in use, the machines have been classified into six different groups of comparable stock capacities. Each group will take a definite size tool, and the holders are provided with suitable mounting or clamping devices.

The American Standard for Machine

The American Standard for Machine Tapers (B5.10-1943) was first approved in 1937 to limit the different types of tapers in use. It was later decided to revise the part of the standard dealing with the self-holding taper series. The standard now sets a uniform practice for the slope of self-holding and steep machine tapers, the detailed dimensions for this type of taper tool shank, and the corresponding dimensions for the taper socket in the spindle of the machine, including the dimensions of the keyways.

The American Standard for Machine Tapers is available at 60 cents a copy and the American Standard for Circular and Dovetail Forming Tool Blanks at 50 cents a copy from the American Standards Association, 29 W. 39th St.,

New York 18, New York.



the heir atic ine . ved of

nine ору rcunks can St.,

ES ed

oase s so last face p or No end h of

Co. 4. Y. ular ning





l to ling The tice eep ons and the mathe

April, 1944



## UNISHEARS Cut Sheet Metal Faster!



Stanley Unishear No. 214 - Cutting capacity 14 gauge bot rolled steel.

Stanley Unishears cut sheet materials as fast as you feed, up to 15 feet per minute - follow any line accurately, straight, curved or angle - leaving smooth, clean edges with no waste of material. Plenty rugged for tough production or maintenance use.

Portable Unishears are made in four models - for 18 gauge, 16 gauge, 14 gauge and 12 gauge hot rolled steel or galvanized iron. Stationary Unishears are also available to cut 14 gauge and 10

gauge sheets. Write for literature. Stanley Electric Tool Division, The Stanley Works, New Britain, Connecticut.

### STANLEY UNISHEARS

**Electrically Driven Metal Shears** 



PLOMB SOCKETS TO HELP SPEED WAR PRODUCTION

They give longer service... Properly used, they will last indefinitely.

All other tools in the Plomb line are also built to highest quality standards. From midget

FOR

We hane

tion trad

You tant

H

Ple

FIR AT AD

April,

screwdrivers to mammoth industrial wrenches they are famous for the better, longer-lasting service they give. For better war production, see the Plomb dealer near you for your hand tool needs.-Plomb Tool Company, Los Angeles 11, Calif.





YOU CAN'T AFFORD TO MAKE Your GAGE HANDLES

Why? BECAUSE YOU CAN BUY

(TAPER-LOCK AND TRI-LOCK)

FOR LESS THAN YOU CAN MAKE YOUR OWN

We are the largest exclusive manufacturers of gage handles in the country. Because of quantity production our prices are positively the lowest in the trade — yet our quality is unsurpassed by any maker of gage handles in the industry.

Do you still make your own plug gage handles? Your competitor doesn't. Most all nationally important gage manufacturers use Huron's exclusively.

### ALL 10 STANDARD SIZES

	Write	for	literature	- prices	— discounts,	e
_						

HURON MACHINE 5555 Conner Ave.

Please send me your literature on PLUG GAGE HANDLES.

FIRM NAME ATTENTION OF

ADDRESS

STATE CITY

and eed. eels

they

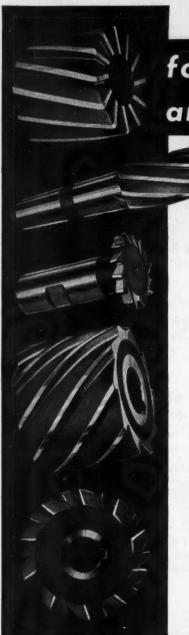
built

dget

the

see

Too



## for ACCURACY and ACTION!

## A Full Service In Cutting Tools To Your Specifications

So

DE

Spo

Size

Eac

Your orders for cutting tools will receive special attention here.

Special fixtures and equipment many of our own design—plus rigid inspection—make it possible for us to handle difficult designs of cutting tools with accuracy and speed.

### SPECIAL FACILITIES FOR MILLING CUTTERS

dovetails—Flat form tools and tool bits

Specially attractive schedules for cutting tools of the above types (except form relief milling cutters).

Note—we make no tools for stock—all tools made to your blue prints or specifications. Illustrated circular on request. Send us your inquiries for prompt estimates.

### WARREN INDUSTRIES

26667 Mound Road, Warren, Mich.

## Taps Without Handicaps

Solid, sturdy chasers, rigidly supported. Ample chip space insures smooth cutting and clean accurate screw threads. . . . . GOOD DELIVERIES!





Space limited? Time for backing out unimportant? The Class SJ Solid Adjustable Tap is your tool. Adjustable to required decimal size and fit. Chasers resharpened easily by removing from tap.

Each size in these tools cuts a wide range of diameters and pitches.



The Geometric Tool Company

New Haven 15, Conn.

re-

gid

s to

ept

on for

ch.



The Electric Eye, Standing Guard over the Danger Zone, Prevents Operation of the Press while the Operator's Hands are in the Machine

(Westinghouse)

W

pr

er

pr tic dis It

re ph

me ab is

the str tre

der for cra Th per ine hel

clo

app

ern

dus ing

sol

int

brie

## Machine Shop "Magic"

By H. H. SLAWSON

Properly harnessed, a beam of light can be made to do the work of a safety guard, a starting or stopping lever, a temperature control instrument, a counter, or an inspector on quality or quantity, and do it better.

To start the cycle of operations of a huge stamping press simply by waving one's hand, or to guard a machine with a curtain of light which stops the machine upon penetration may savor of magic. But not if you know what's behind it.

This modern magic is called "electronics." The science of electronics is not new; it is at least 35 or 40 years old, but it is now just beginning to come into its own. Folks who ought to know seem to think we are headed for an "electronic" world. Certainly the story of electronic engi-

neering, as it unfolds from day to day, seems to imply that we are on our way.

Most of us have encountered the results of electronic engineering, in the electric eye or other forms, more often than we have been aware. We have seen it open doors and turn on drinking fountains without the aid of human hands. We have watched the elevator leveling off even with the floor, and noted the refusal of the door to budge until the elevator is in a safe position. And then there was that time that the cops charged us

Inter Bear Instrains It C Long

April

with speeding on the highway, and proved it—with electronics.

luard

vents

e the

house)

he

m-

on

to

on

the in ore We on I of

the

the in

was

us

1944

But that is not all that this modern magic can accomplish. It enables the blind to read print, plays an organ that lacks reeds, pipes, or strings, prevents ballot box stuffing at elections, creates artificial fevers to kill disease germs, and captures thieves. It detects the approach of death, and reveals faint stars in the sky where photographic plates failed to find them. For the aviator's benefit it measures the height of the clouds above the Earth, and warns him if he is flying too close to a mountain peak.

One of the most important in the recent applications of electronics is the development of "radar"; an instrument which, by means of electronics, accurately locates enemy air-

craft which may be hidden behind cloud banks and indicates the height for which the anti-aircraft shells must be set. These instruments are performing a service of inestimable value in helping to win the war.

Bringing the subject closer home; electronics is finding innumerable applications in the modern machine shop. Industry is just awakening to the possibilities of the "electric eye" for solving various types of intricate problems. A brief review of some of

the outstanding tasks performed by the "eye" may suggest useful applications to the reader.

Light is an intangible thing; yet, through the photo-electric cell, commonly known as the "electric eye," light is easily controlled and can be put to work in amazing ways through the application of electronics. Just how this new science accomplishes its feats is not clear, even to the scientists. They only know this; that tiny particles of matter, called electrons, are emitted from metal to set up a flow of current in tubes like those in the radio.

Sensitive to a beam of light falling upon it, this tube responds when the beam is interrupted by some object passing through it and, when properly harnessed, can be made to perform



Interruption of the Light Beam by a Workman's Hands Instantly Locks the Mechanism of the Machine so that If Cannol Operate—for as Long as the Man's Hands are in Danger

(Westinghouse)

## Get BETTER FINISHES on YOUR Ground Surfaces



## with the POPE BALANCING KIT

With this new POPE Balancing Stand, Arbor and Wheel Holder kit you can balance your grinding wheels quickly and accurately.

BETTER
BETTER
EINISHES

Right away you'll notice a big improvement in your grinding finishes.

Write for this new, illustrated booklet"S".

### POPE MACHINERY CORP.

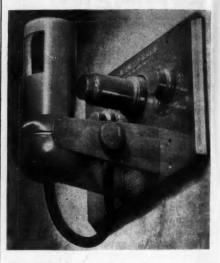
Established 1920

HAVERHILL . MASSACHUSETTS

**Builders of Precision Spindles** 

as desired. Passing up further explanation and taking the tool for granted, let's see what this "eye" can do to be useful in a machine shop.

The stamping, trimming, and forming machine referred to in our opening sentence has been available for several years. It is described as a rotary shear with cutters mounted on a vertical shaft. The work being



When Daylight Starts Fading Toward the End of a Winter Day, or when Storm-Clouds Gather, this Photoelectric Lighting Control Unit Automatically Turns on the Lights. It also Turns Them off again, if They are Not Needed

(General Electric)

Blai day paid

Tap

inve

Eith

left-

Pleas

No. 2

NAM

COM

STRE

CITY.

63

BLAK

DIAM

April,

trimmed remains in a horizontal position on the table top, and to enable the operator to load and unload, one cutter is moved to and from the other. In straight production, after the piece to be trimmed has been placed in position, the operator passes one hand through a beam of light that falls on a photo-electric cell. Electronics does the rest.

Formerly the machine was operated by a foot pedal which, upon being depressed, actuated a pneumatic cylinder so arranged that the piston con-

MODERN MACHINE SHOP

April, 1944



### PAID FOR ITSELF"10 times over-"

Another of the country's leading manufacturers recently bought a Blake Tap Grinder. It has been running continuously—three shifts a day—sharpening the chamfer on stud bolt taps. "This unit has already paid for itself ten times over," is typical of the comments regarding Blake Tap Grinders. But you get other advantages, too — tremendously increased tap life — less work spoilage — fewer broken taps — less tap inventory.

The Blake is built in two models for taps No. 0 to 2" and up to 14" long. Either model will sharpen taps with 2, 3, 4, 5, 6, 8 or 10 flutes, right- or left-hand, without extra equipment.

COMPANI

STREET

STATE M.M.S.



### **EDWARD BLAKE COMPANY**

634 COMMONWEALTH AVE., NEWTON CENTRE 59, MASS.

BLAKE TAP GRINDERS—FILTAIRE PORTABLE DUST COLLECTORS—AMERICAN TOOL HOLDERS—BLACK DIAMOND PRECISION DRILL GRINDERS—L & D HICH SPEED DRILL PRESSES—WALTHAM CUTTER SHARPENERS

April, 1944

exfor

enfor s a on

End

ther,

utourns

osi-

ble

ner.

po-

alls

ted

de-

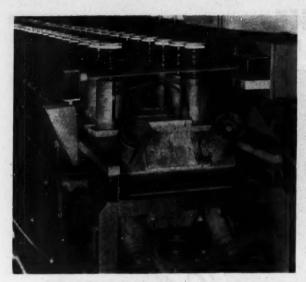
lin-

on-

d

MODERN MACHINE SHOP

179



It the Pieces on this Conveyor are not Removed before they Break the Light-Ray, a Switch is Automatically Thrown Which Immediately Stops the Forward Motion of the Conveyor

trolled the opening and closing of the rolls. This mechanical arrangement has been displaced by the electric eye. Interruption of the beam of light lets loose in the photo-cell an infinitesimal stream of electrons that are amplified to a magnitude which, when routed through the relays, is able to throw a switch and set the machine in motion. Cutting speeds vary from 10 to 60 feet per minute, depending upon the size and kind of material in process. The operator can, at all times, stand firmly on both feet with both hands free.

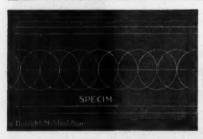
Comparatively simple and uncom-

plicated, this application has many counterparts in other industrial operation. But the "eye" is able also to handle delicate tasks with the same degree of dependability and accuracy, as has been demonstrated by its application to heat treating processes.

When steel is heated in a furnace, it radiates a definite color at a given

temperature. An electric eye, set to respond to the shade of color which indicates the specified temperature, is set to watch the heating process. Upon the instant the steel reaches the desired temperature, and faster than a human hand could be moved, the "eye" cuts off the heat.

An interesting example of this application is found in the annealing of front axle pins for Pontiac automobiles. After being case hardened, each pin has to be annealed for a distance of two inches at the center. The heating mechanism operates upon the electric resistance principle, the pin being



## DYKEM STEEL BLUE Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time

prevents metal glare. Increases efficiency and accuracy.

Write for full information.

#### THE DYKEM COMPANY

2301 F. NORTH 11th ST.

ST. LOUIS, MO.

(In canada: 444 Pacific Ave., Toronto, Ont.)

Conbeghtactiedi-Mo-

terrial ye" ndle the end-

to ses. ted ites ven to ich

ted

the han the

of moach nce

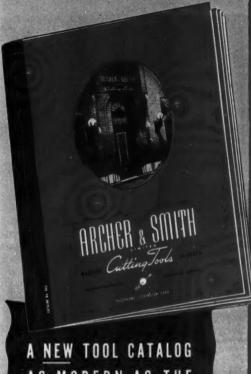
eatlecing

out the me

icy.

---





A NEW TOOL CATALOG
AS MODERN AS THE
PLANT IT REPRESENTS

It takes you on a "tour" of this modern, fully departmentalized plant that offers "ALL THAT IS BEST FOR PRECISION and SERVICE IN CUTTING TOOLS" ... and presents tool data you need.

Write for Catalog - Send Blueprints

ARCHER & SMITH

Cutting Tools 11-1111

TELEPHONE: LEXINGTON 5380 Metalworking industries broughout the country are erved locally by Archer & mith, Ud., thru experienced

Opportunities

IN SOME TERRITORIES

FOR THE "RIGHT"

REPRESENTATION

tives. In a few industrial zones there are territories that are not now assigned. If you feel that you qualify,

we shall be pleased to hear from you.

ARCHER & SMITH, LTD,, 125 NORTH EASTERN AVE. LEXINGTON 34, KENTUCKY

Please send latest Cutting Tool catalog. Blueprints of special tools we require are enclosed; or mailed under separate cover.

Name.....

Title

Firm Name

Address

Cite

...State.



Using a G. E. Portable Elec-tric Thickness Gage to Test the Thickness of a Bearing Lining. The Gage is also used to Test the Thickness of Plating where such Thick-ness must be Accurately Controlled (General Electric)

Using a G. E. Portable Elec-

into action, opening the heating transformer's primary circuit and releasing the clamp that holds the pin. The pin drops into a basin of water, thus halting spread of the heat beyond the specified limits. Six pins per minute are annealed by this process, with no guesses

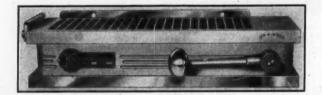
and no failures.

Control of conveyors is a job made to order for the "eye" and the applications are many. Where several conveyors are operated in a chain, syn-

held in a clamp for heating.

Watching those two inches of the pin is an electric eye, and as the temperature at the center of the pin reaches 1100 degrees F., the eye goes

### Permanent CHUCKS KAR



Cannot Fail **Hold Work Tight Generate No Heat** 

An outstanding and exclusive advantage of the KAR Permanent Magnet Chuck is its ability to hold smaller pieces securely due to the close spacing of the pole pieces.

Release Easily **Used Wet or Dry** Use No Power



ENGINEERING CO BARRINGTON MASSACHUSETTS



### CATALOGUE

72 Pages, illustrating and describing the most complete bearing service on the market. It's FREE.

# Install JOHNSON Leaded Bronze BEARINGS

● How many "lazy" motors in your shop? Before you blame the equipment . . . check up on the bearings. In order to get maximum power from each unit, it is necessary to install bearings that are designed to assist the motor . . . not retard it.

Johnson Leaded Bronze Bearings enable you to get the most from your motors. A special high lead bronze alloy...plus correct design...correct tolerances... gives you the long life, the smooth operation and the power you have a right to expect. Reasonably good service is available on Johnson Electric Motor Bearings for more than 250 individual types of motors. A request will bring a copy of our new, completely illustrated catalogue.

Write Today.

JOHNSON SLEEVE BEARING 590 S. MILL STREET



BRONZE HEADQUARTERS NEW CASTLE, PA.

ec-

ing dsc ol

trici

he

r's

renat

of ng

m-

his ses

oli-

n-

m-



Ai the Right End of this Sheet Steel Shear-ing Machine is the Photo Electric Hole Detector. In the Foreground the Operator can be Seen at the Control Table. Control Devices for Operating and Adjusting the Hole Detector and Marker are in the Two Boxes at the end of the Detector.

(Westinghouse)

ne De

Sh

for

Ho

at tri

as

ma

of

era

op za

an

de

the

eng

on

m

gir

at

lin

haj

gin

is :

con

of 1

ligh ma saw the

sev

for

oth

a m

into

mer

set

so t

P

1

operation of feeder lines which carry sub-assemblies to the main assembly line. The sub-assembly line are routed in sequence exactly timed so that each assembly reaches the main assembly line at

the exact moment when it will be needed. Removal of the unit keeps the conveyor moving. Should the workman fail to remove the unit from the conveyor at the proper place, the unit will bump into a light-beam bridging the conveyor and interruption of the light-beam will stop the conveyor until the unit has been removed.

At the Pontiac factory the engines are assembled on a mezzanine from which they are lowered to the final

chronization is maintained perfectly by an "eye" set to control the motor of the key conveyor. If one conveyor runs too fast or too slow, its travel is automatically adjusted. If it becomes necessary to stop one conveyor altogether, the "eye" stops it until conditions are correct for it to proceed. Then, automatically, the halted conveyor proceeds at the proper pace.

In some automobile factories the electric eye is used to control the



184

Closeup of Control Cabinets for Electronic Hole Detector on Sheet Steel Shearing Line. Amplifier, Relays and Circuit Transformers in Cabinet at Left Regulate Operation of Hole Detector. Cabinet at Right holds Photo Electric Tube and Relays for Use with Device which Marks Steel Strip so that Hole can be Found Later (Westinghouse)

of

ole

the

on-

ina

and

wo

use)

ed-

ar-

ies

as-

he

n -

in

tly

nat

oly

ain

at

ent

he

ıld

nit

ce,

ım

D-

he

re-

es

m

al

assembly line on the main floor by means of a hoist which operates through an opening in the mezzanine floor. Should anything occur to delay the lowering of the engine block, it is obvious that the engine assembly line on the mezzanine must instantly be stopped, else the engines will pile up at the end of the line. This never

happens, because an electric "eye" is on the job to prevent it. If the engine at the end of the conveyor line is not removed, the "eye" stops the conveyor.

In operations calling for the cutting of rods, tubes, or long pieces of stock, light beams are employed to halt the material at the proper place, set the saw in motion, release the saw when the piece has been severed, eject the severed piece and adjust the machine for resumption of the cycle.

Prevention of accidents is yet another function which can be alloted to the "eye." Where it is necessary for a machine operator to insert his hands into a "danger zone," the two elements of the electronic guardian are set up either side of the danger zone so that, as the operator reaches into



the machine, his hands break the beam of light between the two elements. With the light shut off, a switch is automatically thrown which prevents the machine from operating until the operator's hands have been withdrawn.

The "curtain of light" mentioned earlier in the article is another variation of the safety application. This device is used in connection with such machines as large presses for forming automobile bodies, and is used to encase the danger zone with a wall of light from 12 to 30 inches high. Obviously the operators and helpers must be clear of the machine before it can be operated.

The fact that the photo-cell is 20 times as sensitive and infinitely faster than the human eye makes it espe-

cially valuable for inspection work. Set, for instance, to watch the diameter of a wire that is being drawn in a wire mill, the "eye" will halt the machine if the die becomes worn beyond a tolerance of 0.00001 inch. The old-timers who read this will remember when 0.001 inch was passed as a good job.

With equal facility the photo-electric cell is used to spot pin holes as small as 0.01 inch in steel sheets moving at a speed of up to 1,000 feet per minute. And, having found such a hole, the machine marks the strip alongside the hole so that a workman can spot it without difficulty and the section can be eliminated.

Ford Motor Company uses the "eye" to perform 11 inspections on valve push rods at a rate of 40 rods per minute, including a difficult, delicate test for hardness. Should any rod fail to measure up to the required standard at any of the 11 test sta-

tions, the "eye" actuates a mechanism which throws it out. Counting, sorting, and weighing are other operations that are easily performed by this infallible and tireless worker, with results far more accurate than can be attained by human optics.

The use of photo-cells for the automatic opening and closing of doors in a factory may seem like a far-fetched application, but one establishment reports that with electric "eyes" set to watch six huge doors in their receiving and shipping department they have cut heating costs as much as \$30 a day. At the same time, more comfortable temperatures were maintained for the employees.

Electric eyes are serving also to save coal bills, by promoting more intelligent firing of factory furnaces. An "eye" located in the chimney stack notes the changing density of the smoke and conveys the information to the fireman below. This is done



hang, erby ter, nan

in ned reset reney as ore

to ore ces. ack the cion one

Tools are weapons Treat 'em Right **EQUIP YOUR** MACHINES with high quality

MORSETHERE IS A DIFFERENCE

TWIST DRILL AND
MACHINE COMPANY
NEW BEDFORD, MASS., U.S.A.

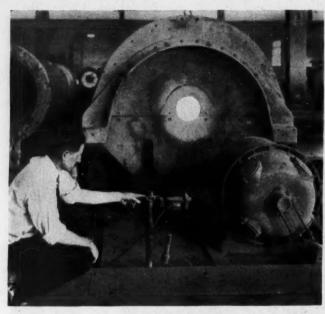
NEW YORK STORE: 130 LAFAYETTE ST. - - - - CHICAGO STORE: 570 WEST RANDOLPH ST.

April, 1944

944

MODERN MACHINE SHOP

187



Photoelectric Tube and Optical System Focussed on Spinning Pipe for Registering Radiant Energy of Molten Metal through Amplifier Panel, Controlling Shut-Down of Spinning Motor

(General Electric)

tact which shuts off the generator and at the same time looses a shower of compressed carbon dioxide.

Not to be overlooked in this same group of policing functions is the "eye's" brilliant record of fast work in trapping burglars or saboteurs. For

this job, invisible infra-red or "black" light is substituted for the clear white beam which ordinarily comes from the photo-cell. As the prowler passes through the unseen path of light, totally unaware of its presence, the eye transmits a silent alarm to the watchman's station. Or it can sound a bell or siren, close doors and turn on flood lights, leaving to the guards only the task of rounding up the intruder. One ingenious installation included a camera which made flashlight photos

by means of a recording instrument, or by an alarm bell or signal light, telling the fireman to close the draft.

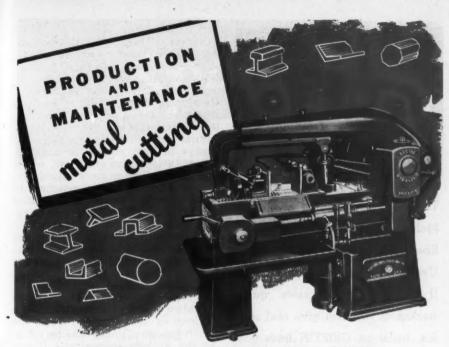
Factory fires are detected by the "eye" long before the heat is sufficient to actuate alarms or fire extinguishers. Upon the appearance of a fain wisp of smoke the "eye" goes into action, opening fire extinguishers and sending out calls for the fire fighting corps. Should the smoke occur in a generator that would be injured by water, the "eye" simply closes a con-



## SAFETY EQUIPMENT FOR POWER AND FOOT PRESSES

Combination Gate and Barrier Guards
Two-Hand Safety Starting Devices
Sweep Guards...Single-Stroke Attachments
Treadle Guards...Fly Wheel Guards, etc.

JOHN HUMM SAFETY EQUIPMENT CO. 251 SHEFFIELD AVE. BROOKLYN, N. Y.



### with RACINE hydraulic HEAVY DUTY METAL saws

The Racine Heavy Duty Production Saw has a progressive combination "Positive" and "Flexible" hydraulic feed. The "Positive" feed predetermines cutting time. Each cut, even though it be made in tough alloys or tool steels, is made in exactly the same length of time.

The "Flexible" feed permits blade to cut faster when resistance is reduced. Faster cutting is attained in round bars, tubing, through the thin section of structurals and other shapes, by the use of this feed. This progressive combination "Positive" and "Flexible" feed is exclusive with Racine.

Racine's complete saw line includes a wide range of machines. Models are available to meet the varied requirements of all metal working industries. Capacities from 6" x 6" to 20" x 20".

Write for complete catalog and time study of your work. Address Department MM-S.

### RACINE OIL HYDRAULIC PUMPS AND VALVES

Racine "Variable Volume" Oil Hydraulic Pumps and "Balanced Piston" Valves provide special advantages for hydraulic circuits in a wide variety of applications. Pump capacities of 12-20 and 30 G.P.M. Operating pressures 50 to 1000 lbs. Valves in all sizes to 1½". Write for Catalog P-10-C.



RACINE
TOOL AND MACHINE
COMPANY
Standard for Quality
and Precision
RACINE. WISCONSIN



b e tem

of ugh

tric)

its tor me mdieris 00is ilof por r k" te

mes

0-

ye

h-

a

on

ly er.

OS



The line is complete, GRIFFIN Molybdenum High Speed, High Speed Steel, Soft-Back, and Soft-Center for any job you may have. If you need hacksaws quick, hacksaws that will give real service, insist on GRIFFIN from your distributor or write us

### JOHN H. GRAHAM & CO. INC.

GENERAL SALES AGENT

105 Duane Street New York City



of the unwelcome visitor.

Control of factory illumination is still another chore that has been turned over to the unfailing "eye" in some establishments. When lights are controlled manually, human judgment is often uncertain as to just when they should be thrown on. The "eve," on the other hand, never hesitates. When natural daylight begins to fade, the change in light volume or strength affects the sensitive photo-cell, which immediately goes to work closing circuits and throwing light switches. In some cases the current is controlled so that as daylight fades into darkness outside, the candlepower within grows steadily higher and higher, but so imperceptible is the change that the worker is practically unaware of the switch from natural to artificial light.

A record was made on a lighting installation which provided 8,000 watts to each of two adjacent areas, one controlled by a photo-cell; the other by the workers themselves. During a three-month test the manually-controlled circuit consumed 2½ times as much current as the circuit controlled

by the "eye."

How far the application of electronics to mechanical operations may go is a matter for speculation. In a number of instances electronic-controlled mechanisms have been installed in automobiles and ships, and more recently the Germans have been using "radio-controlled" tanks, loaded with explosives, in the battle for Italy.

Reports have come from Russia of a Soviet scientist who developed a laboratory model of a machine into which a blueprint could be fed to produce a perfectly-finished metal part on a lathe some distance away. The drawing, we are told, is scanned by an electric eye which converts the outline on the drawing into electrical impulses which are used to control the movement of the cutting tools. It sounds fantastic, but perhaps in

# partan

## FOR METAL **CUTTING MEN**

The SPARTAN LINE of Hack Saws and Band Saws offer the right blade for every job, blades that today are out in front in hundreds of plants.

Spartans are furnished in High Speed, Kutall Molybdenum High Speed, Flexard, All Hard and Flexible styles and Metal Cutting and Wood Cutting Band Saws.

Stocked by Distributors in your territory from whom you can obtain service promptly.

**BUY SPARTANS** 

See Your Distributor Today

SPARTAN SAW WORKS, Inc. Springfield

HACK SAW BLADES

April, 1944

is mne nis ey on en he th

ch ir-In

led knin ut

at of

ial

in-

tts ne

er ng

nas

ed

ngo

n-

11-

re ng

th

of to

0rt he by he

al ior ls. in

44

MODERN MACHINE SHOP



As Truck Operator Passes Photoelectric Cell on Way to Door, the "Electric Eye" Actuates Mechanism which Opens Door. Electronics Applied Here Saves Approximately \$30 on Heat Bill Alone

(Westinghouse)

Significant also is the remark of Dr. Willis R. Whitney of the General Electric Company. Speaking before the American Institute of Electrical Engineers some months ago, Dr.

Whitney said, "Electronics seems to me as extensive and promising a new science as the whole field of electricity seemed but a few years ago."

On such authority it would seem worthwhile for industrialists to keep their eyes on the "eye."

Colmonoy Hard Facing Alloys and Overlay Metals are the subject of a profusely illustrated eight-page catalog now being distributed by the Wall-Colmonoy Corp., 720 Fisher Bldg., Detroit 2, Mich. Copy of Catalog No. 75 free upon request.

another twenty years we will be taking it in stride.

Thomas Alva Edison first encountered electronics when he was developing his incandescent lamp, six decades ago. Marconi employed it directly in the development of "wireless telegraphy" which we now know as "radio." Once started, the scientists have learned swiftly. And now Dr. Karl Compton of Massachusetts Institute of Technology declares that "the field of practical and commercial uses of electronic devices is still largely in the early stages of exploration."

FASTER, MORE
ACCURATE
MARKING
Write for
Descriptive
Literature.

THE ACROMARKER

The No. 1 Model is especially suited for fast marking, numbering and lettering serial numbers, voltage indications, code letters, identification marks, manufacturers' key, etc. Easy to operate, the No. 1 Acromarker requires merely a swing of the handle to exert powerful screw pressure of the dies on the parts to be marked. Dies are automatically advanced for character spacing, and are replaceable.

THE ACROMARK COMPANY

NO UNDERCUT THAT HELPS IDENTIFY WELDING TROUBLES UNDERCUT X

New trainees learn to spot faulty welding procedures faster... "old hands" can increase their efficiency... with the help of this new 24-page book. By stressing accurate visual inspection, it helps boost both weld quality and quantity.

Each of 14 common welding troubles is illustrated; causes are analyzed; cures are outlined.

The book is pocket-size—ideal to take home to read or keep handy to consult on the job.

It's a handy trouble shooter for problems like splatter, corrosion, undercutting and brittle joints. Order a copy for each of your welders today.

This same information is also made available by Westinghouse in chart form for wall mounting. Write for free copies of booklet B-3326 and chart DC-250 on your company letterhead. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.

J-90497-1-A



Welders, Electrodes and Accessories

April, 1944

MODERN MACHINE SHOP

193

etric Door, Eye" nism Door. lied roxi-Heat

also c of

R. the etric eakthe stirical me Dr.

me scicity

eep

and pronow onoy lich.

re-

r fast abers, cation erate, ing of of the autoad are

1944

# M°CROSKY SUPER

Inserted-Blade



### REAMERS





STANDARD McCrosky Super Adjustable Reamers delivered from stock have started thousands of war production jobs with a minimum of delay. These time-saving applications are possible because Super Reamers are available in many different styles, with a wide range of sizes in each style.

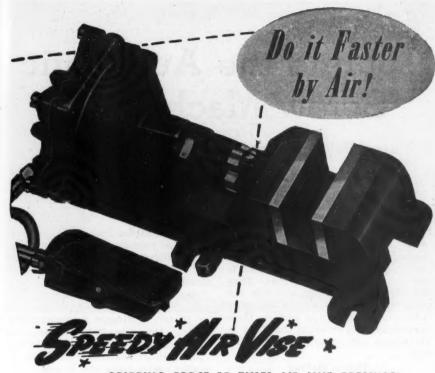
This fundamental advantage is increased by the ease and economy with which Super Reamers can be maintained at top efficiency. The time-tested Super Pin-and-Screw Lock permits quick adjustment and resharpening of reamer blades. When the original set of blades wears out, the reamer can be completely renewed by a new set of blades. Each size of blade services many different sizes of reamers.

You can depend on quick deliveries of Super Reamers and extra blades from adequate stocks protected by continuous production.



For further information, write to MCCROSKY, MEADVILLE, PA.

> Super Adjustable Reamers o tack lask Milling Cutters - Wisand Quick Change Chucks - Adjustable Black Roving Bass Turret Tool Posts + Igesial Purpose Tauls



#### GRIPPING FORCE 15 TIMES AIR LINE PRESSURE!

America's war plants are switching to new, powerful Speedy Air Vises! From a single vise... to an installation of fifty... they are saving time, effort and labor costs! Air operated, foot controlled—both hands are left free for more rapid drilling, tapping, light milling, assembly, etc. \$24

Complete with Foot Control Valve, Air Hose and Fittings, only

#### DELIVERY 7-10 DAYS! ORDER FROM YOUR MILL SUPPLY DEALER OR WRITE DIRECT



W. R. BROWN CORP., 5725 ARMITAGE AVE., CHICAGO 39, ILL.

April, 1944

Adrom of

ons are

ased

ncy.

ock

ning

t of letesize

of

of

ade-

pro-

944

MODERN MACHINE SHOP

195

# Tooling the Automatic Screw Machine, X

Thread Rolling, Skiving, and Shaving Operations— Design of Tools

By NOEL BRINDLE

THE rolling of a thread, the skiving of a profile on a part, and the shaving of a diameter are among the operations occasionally performed in the automatic screw machine. They are not common to the average run of screw machine products, but when it becomes necessary to perform these operations, it is essential that they be performed efficiently and economically.

#### Thread Rolling

A thread rolling operation is virtually the sole practicable method for producing a thread at the cut-off end of a part or behind a shoulder. It is impossible to produce threads in such locations by using a die holder held in the turret; therefore the thread rolling method definitely eliminates a second operation.

The rolled thread is produced by the use of a hardened steel disc the design of which embodies a threaded form to suit the thread required on the workpiece. The threaded disc is forced into the workpiece, displacing the metal sufficiently to develop the thread. The process of developing a thread by displacing the metal under pressure is similar to a side knurling operation.

Thread rolling operations are read-

ily performed on brass or aluminum. It is also possible to roll a thread on high sulphur steel, but the results are not always satisfactory from a standpoint of thread quality.

For thread rolling operations four types of holders are available for use on Brown & Sharpe Automatic Machines; the side knurl holder, the knurling swing tool, and the top and bottom knurl holders. For use in the multi-spindle machines, a side knurl holder is preferred. This holder can be mounted on any of the side slides of this type of machine.

It should be noted that some type of support is usually required when rolling a thread. Otherwise, the work will spring away because of the side pressure.

The disk or roller used to produce a rolled thread should be made with particular care regarding the type of steel and the hardness specified. Probably the most important consideration is the sharp threads which are required at the top of the threading roller.

A full description of the procedure to be followed in figuring the type of threading roll required for a particular job will be found in any of the better-known Handbooks.



NTERESTING new processes are just over the horizon for many industries—employing new materials, producing new commodities.

Most of these new processes—including yours, no doubt—will require holes by the thousands or the millions in the future as heretofore. Holes drilled and reamed in multiples. Good holes, accurate holes—holes produced for less money. Cle-Forge High Speed Drills and Peerless High Speed Reamers can help you keep production up and costs down on any material.

"Cleveland" men can help you plan ahead —your Industrial Supply Distributor can help you too.

He is trained in keeping you supplied with hundreds of different items needed in your daily production—he is trained to order ahead to save you from running short. Your Distributor is giving you a priceless lift today and will be still better trained to serve you in the years ahead.

Until the Emergency ends—and in all your peacetime operations to come—make it your business always to

## Telephone your ♦♦♦ FIRST!



The CLEVELAND

TRADE MAIN REG. U.S. PAT OFF AND FOREIGN COUNTRIES
30 READE ST. HEW YORK 9 NORTH JEFFERSON ST. CHICANO 650 NOWA
6315 SECOND BLVD, DETROIT LOWDON S. P. DARRUS, LTD. 30-36-37 PPP



on ults

our use Mathe

the

url

can

des

ype

hen

ork

ide

uce

ith

of ed.

are ing ure of cu-

944

### TO PREVENT-

#### STOPPING PRODUCTION MACHINES FOR REPAIRS



If you want steady, uninterrupted production—lower machine-repair costs and freedom from misalignment troubles, take advantage of the long-lived CUSHION TORQUE developed by the KANTI-LEVER COUPLING. It not only protects you against misalignment like the ordinary coupling, but it goes several steps further and cushions your Motors and Productive Machines against the wear, vibration and fatigue that are the source of most machine failures. No other coupling is like the—

## Kanti-lever Coupling

It has a circular series of laminated, resilient Cantilevers of 200,000 lb. steel operating in taper-side slots. End thrust is impossible: leverage on the cantilevers decreases automatically with increased load: safety stops prevent damage from extreme overloads: special end-float obtainable up to four inches without increase in cantilever stresses: outer periphery can be used as a brake drum for quick-stopping machinery. Over 3,000,000 H.P. in service. Send for Bulletin No. 28-M.

# BROWN READING PA

#### Skiving and Shearing

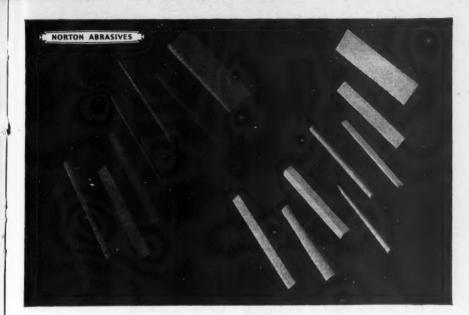
Generally speaking, a skiving operation can advantageously be used to produce a long part having an irregular profile. It is usually found necessary to use a skiving type of tool when the shape of the part requires a small diameter at the cut-off end and the length of the formed portion is quite long in relation to diameter. If a circular form tool were used, the widest cut would take place when the form tool had reached the smallest diameter to be formed. Therefore, the part would break from the bar.

A skiving tool can be arranged to produce the profile farthest away from the chuck first, then gradually the remainder of the formed portion. In other words, when the smallest diameter is finally skived, the remainder of the profile of the part has been completed. Therefore very little pressure is applied at this critical stage of the operation and there is much less possibility of the part being broken from the bar during the cutting.

The cutting end of the tool embodies two angles. The first, an angle for engaging the work progressively, the second, a rake angle of proportions adapted to the material to be cut. A special tool holder is usually provided to suit the size and shape of the skiving tool. This holder can be mounted either on the front or back cross slide and the tool can be used with the spindle running in a forward or backward direction by allowing it to cut over or under the work to suit the job.

Unless the part to be skived is quite large in diameter and the operation is performed close to the chuck, it is necessary to provide a support held in the turret, which will resist the tendency of the part to spring away from the skiving tool.

There is another type of tool very similar to the skiving tool which is



## They Pay Big Dividends

FOR HAND-STONING TOOLS, India and Hard Arkansas Oilstone Shapes pay their way hundreds of times over through faster, better, more cuts from the bits, drills, reamers, and millers they sharpen.

The resulting increased output from the keener edges produced can easily run into hundreds—yes, thousands—of dollars from a tiny investment in some of these precision oilstones (say 75 cents for a rough average).

Whether all your cutters are sharpened at a central location under a trained tool engineer or touched up right at the machine, by all means bring up the final edge by hand stoning. It pays amazing dividends in metal and time saved.

AND IN DIE FINISHING, also, these oilstones are indispensable. The great choice in shapes and grits, from coarse India to the unmatched fineness of the Hard Arkansas Stones, makes it possible to impart any degree of finish desired to the most intricate and expensive dies.

Ask our Field Engineer or your friendly distributor's man about them.



BEHR-MANNING . TROY, N. Y.

IDIVISION OF NORTON COMPANY

Also Reliable Coated Abrasives Since 1872

per-1 to gucestool es a and 1 is If the the lest the to vav ally ion. dider een esage

ing ut-

od-

for

the

A

ded

ivted

ide

the

ck-

cut

he

is

rack,

ort ist

ng

is

44

called a "shearing tool." The skiving tool passes over or under the work horizontally, while the shearing tool is tilted at an angle of 4 deg. or 5 deg. This is done to prevent the rubbing that takes place when the skiving tool is used.

The shearing tool is used when hard rubber, phenol fibre and similar materials are to be machined. It has been found that the abrasive condition of the above materials makes it almost impossible to use a circular form tool for producing a profile because this type of tool is required to dwell at the end of its cut. This pause is sufficient to dull the edge of the tool. Therefore, by using a shearing tool which passes over or under the work, only at the cutting edge is there any contact between the tool and the work. However, it should be mentioned that when designing the shearing tool, all the vertical dimensions have to be calculated to compensate

for the tilting of the tool.

#### Shaving Tools

Shaving tools are used primarily on multi-spindle automatic screw machines. Because of the number of spindles, all rotating in the spindle carrier, it is often difficult to form a diameter to the degree of precision required. Therefore, it has been customary to include a shaving operation to produce a part having close tolerances.

ra

gr

HE

STA

Go

che

Uti

cip

onl

sho

be me Ot

12

STA

spe

tip

Poi

ing

16 me

A forming tool roughs down the material, leaving approximately 0.005 inch to be removed by the shaving tool. A shaving blade and a rest block are located together in a detail which has a slight amount of float so that even though the spindles may be slightly free in their bearings, the required accuracy is obtained when the piece passes between the blade and the rest block.

In recent years shaving operations

# Precision DRILLING

#### use ACME DRILL JIG BUSHINGS



★Close tolerances, precision drilling and other rigid specifications must be adhered to in the manufacture of critical war products. And Acme has been helping war industries to meet these requirements by supplying drill jig bushings that assure accurate location of drilled holes.

Wartime demands, however, required no change in manufacturing methods at Acme. The same standards of precision that existed prior to the war prevail today. And during peacetime, Acme bushings will continue to serve industry efficiently in the manufacture of post-war products.

In war or peace, make Acme your bushing headquarters.



#### ACME INDUSTRIAL CO.

 for measurements ranging from 5% to 1 with UX Indicator graduated in .0001

### Fast, Light, Accurate

nn

8-

lle

on

n r-

05 ig

ch

at

e

ne

le

as

HERE'S the newest addition to the STANDARD family of Dial Bore Gages. A small, lightweight, fast checking instrument for small bores.

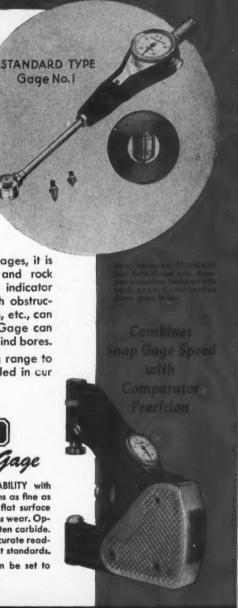
Utilizing the same centralizing principle of other STANDARD Dial Bore Gages, it is only necessary to insert the gage, and rock handle slightly. Minimum reading on indicator shows exact diameter. Even holes with obstructions such as shoulders, webs, undercuts, etc., can be measured because this Dial Bore Gage can measure within ½" from the bottom of blind bores.

Other Dial Bore Gages with measuring range to 121%" completely illustrated and detailed in our new No. 10 Catalog.



STANDARD Dial Snap Gages combine PORTABILITY with speed in use and absolute accuracy on dimensions as fine as .0001". Adjustable gaging pin has a serrated flat surface tipped with tungsten carbide that practically defles wear. Opposite movable pin has mushroom top, also tungsten carbide. Point-and-plane construction assures continued, accurate readings whether instrument is set by cylindrical or flat standards.

16 Stock Sizes cover Range 0" to 8". Each can be set to measure any dimension within a range of  $\frac{1}{2}$ ".



STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.



pri

# Accuracy with Adaptability

Positive accuracy with versatility and adaptability are combined in the Norton 6"x18" Hydraulic Surface Grinder. Its time-tested workmanship, built-in stability and convenient adjustments and controls make it the ideal toolroom surface grinder for your experts in turning out those fussy, precision jobs.

On the production line this grinder, available with special fast or slow speeds and feeds, is standard equipment for many surfacing jobs where high production and extreme accuracy must go hand-in-hand.

The Norton 6" Surface Grinder is positively accurate enough for your finest toolroom work — is adaptable to production line jobs. Investigate. Norton representatives and engineers are ready to give you every possible assistance in solving your grinding problems.

Circular illustration: Grinding a special length gage with a magnetic sine bar chuck on Norton  $6" \times 18"$  Hydraulic Surface Grinder in a Canadian munitions plant.

NORTON COMPANY, WORCESTER, MASS.

M-455

MORTON GRINDERS

# HERE'S THE RAPID WAY BEARINGS

BULLARD

11 machining operations to a single chucking - with that kind of a set-up you're bound to get speed. In the machining of both interior and exterior of the large roller bearing cup shown here, the individual feeds for main and side heads. simultaneous operation of both heads, and indexing of one head with continued operation of the other. speed production.

For angular cutting the main head is easily swiveled to either right or left. Note the illustration.

Spiral Drive Vertical Turret Lathes are built in 24". 36", 42", and 54" table sizes. Also Cut Master Vertical Turret Lathes in 54", 64", and 74" sizes with two or three heads.



HE BULLARD COMPANY

BRIDGEPORT 2. CONNECTICUT

April,



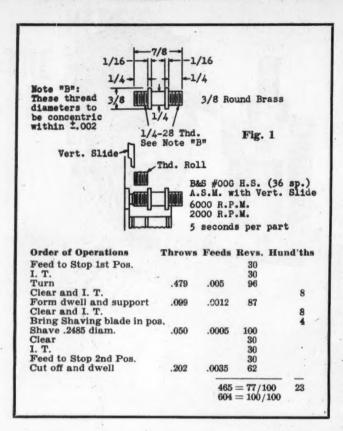
will deliver top efficiency in every stroke!

Whether it's a mechanical movement requiring pressure to clamp...press...raise ... or shift-T-J Cylinders do the job right! Designed for compactness, these Cylinders are accurately machined for correct

plated. Available in many standard sizes and styles...both cushioned and noncushioned types. T-J engineering and skilled workmanship assure utmost dependability. Send for latest catalogs. The Tomkins-Johnson Co., Jackson, Mich.



FOR TOUGH JOBS SPECIFY TOMKINS-JOH RIVITORS AIR AND HYDRAULIC CYLINGERS CUTTERS CLINCHORS



have occasionally been used in the single spindle automatic screw machines when accuracy closer than plus or minus 0.0005 inch is required from one of the cross slides. In general, all shaving tool holders have the same basic design. However, the type and size of machine, the position of the holder in the machine, and the size and shape of the part determine the particular kind of holder to be used.

Figure 1 shows a part which will be made complete in the automatic screw machine. This will require a thread rolling operation on the cut off end. A careful study of the part shows that it will be necessary to feed out the stock, then completely machine the piece in one setting, in order to meet the requirements of Note "B."

The material is brass rod: therefore a high speed machine will be used to assure efficient turning. forming and cutting off speeds. The threading operations require a slow speed; therefore a reversible type machine will be chosen to allow the spindle speed to be reduced while the threads are cut or rolled.

The chuck sketch in Fig. 1 shows that the rear thread diameter will be formed, also the center portion of the part. The thread will be rolled with a roller held in a cross slide side

knurl holder. A blade held in a vertical slide attachment will cut off the finished part.

The order of operations should now be determined. The stock is fed out, followed by the turning of the thread diameter. Clearance time is then allowed while the turning tool withdraws and the form tool is brought into cutting position. While the forming is taking place, the part is supported from the turret. The front end thread will then be cut from the turret, followed by the rolling of the rear thread. A small amount of time should be allowed for the spindle speed to be changed from the threading r.p.m. to the high speed. This will

206

April,

CP-301
Light-weight,
Pneumatic
Production
Drill

#### Ideal for Women

Designed especially for the aviation field . . . amply powered for fast ½" to 3/16" drilling in light metals . . . these light, compact CP 301 Pneumatic Drills are ideal for women. Available in a wide range of sizes and speeds, with angle heads, handles and throttle types to meet every drilling condition. Speeds 2800 to 15,000 r.p.m. Overall lengths (depending upon type of handle) from 6½ to 8½"; weights, from 1½ to 2½ pounds. Write for further details.

CP 301 is only one of a wide range of CP Pneumatic Drills, Reamers, Tappers, Screw Drivers, Nut Runners, Wood Borers, etc. Write for a copy of Catalog 564.

大会会会会会会会会会 PNEUMATIC TOOLS ELECTRIC TOOLS (Micycle...Universal) ROCK DRILLS CHICAGO PNEUMATIC

京大大大大大大 AIR COMPRESSORS VACUUM PUMPS DIESEL ENGINES AVIATION ACCESSORIES

iece , in the of

l is

eed be ef-

ut-

ds.

e a reble vill ow ed ed ds

d.

he n-

1-

er

e

d

h

v

be followed by the cutting off operation.

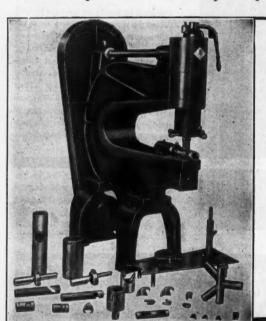
In considering the possibility of overlapping the cross slide operations with the turret operations, it will be noted that while the forming takes place, a support is held in the turret to prevent any side deflection. Therefore, the forming cannot be overlapped.

It will not be possible for the cutting off operation to commence while the rear thread is being rolled because the thread rolling takes place at the slow speed while the 6,000 r.p.m. spindle speed is used for the cutting off operation. It would be possible to partially cut off the part during the forming operation, but this would necessitate two lobes on the cut-off cam. The saving of 33 revolutions which could be accomplished does not justify this additional tool cost.

The throw for turning will equal 0.250 inch plus 0.010 inch for approaching the work. The chuck sketch shows the form tool chamfering for the rolled thread to the root diameter. Therefore, a 0.046 inch which represents the double depth of a 28-pitch thread will be subtracted from ¼ inch to find the root diameter. This dimension will then be subtracted from the stock diameter. The answer will be divided by 2. To the remainder will be added 0.005 inch for approaching the work.

The throw required for rolling the thread will equal the single depth of the thread plus 0.005 inch to approach the work. The throw required to cut off the part will be the sum of 0.005 inch to approach, plus half the stock diameter, plus the depth of the angle on the cutting off tool, plus 0.005 inch for the heel of the tool to pass the center of the spindle.

The feeds for the various cutting operations are now determined. This step may be followed by dividing the



For FAST and SAFE cutting of sheet metal, duplicating parts, and to relieve other machine tools, investigate the

#### SAVAGE NIBBLING MACH

TUBE SLOTTING AND TUBE SHAPING For cutting flat sheets by template or to a scribed line.

#### **Cutting Capacities**

Flat Sheets Mild Steel 3/4" Tough Alloys 3/4' Tubing

Wall thickness to 18" 1" I.D. to 36" O.D.

The Fastest Method of Tube Slotting and Shaping by Guide Template.

Ask for BULLETIN "H"

Manufactured by

#### V I SAVAGE COMPAN

KNOXVILLE

**Pioneer Manufacturers of Nibbling Machines** 

April

# VETERAN!



milling cutter using and hard server. Because of regular resharpening this cutter lasted far beyond its sormal life expectancy.

Hours can be added to the useful life of cutting tools by a policy of regular resharpening. Sharp tools last longer, produce more and better work.

# NATIONAL



SCHOOL SELECT

TWIST DRILL AND TOOL COMPANY

HOME OFFICE AND FACTORY-DETROIT MICE

ch

er.
rech
ch
he
be
he

he of ch ut 05 ck cle ch he ng nis he

# BURKE MILLING MACHINES



No. 4 Motor Driven MILLING MACHINE Mounted on Cabinet Column

Burke motor driven milling machines Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

Write for complete information.

BURKE MACHINE TOOL CO.

feeds into the throws to obtain the number of cutting revolutions.

The revolutions required for the turret threading operation may now be calculated as follows: in the ¼-inch length of thread, there will be 7 threads. This figure represents 7 revolutions of the spindle at the slow speed. To this amount four extra revolutions will be added to allow for approaching the work and opening the chasers at the end of the cut. The 11 revolutions are then multiplied by the spindle ratio of 3 to 1 to obtain the number of revolutions required at the high speed.

The number of revolutions required to feed the stock and index the turret are taken from page 273 of the Handbook. To the 25 revolutions shown, a few extra are added to aid in setting up the machine. The hundredths of cam surface required for the clearance between the turning and forming operations will be found by referring to page 253 of the Handbook. This is shown as 8 hundredths.

At the bottom of page 253 the statement is made that for a 4 or 5 second job, 4 or 5 extra hundredths should be added. Because this part can be made in approximately 5 seconds, 4 extra hundredths are allowed. The clearance time allowed before and after the threading operation is shown as 10 hundredths in Fig. 1. Six hundredths is usually provided for clearance between a circular tool holder and a self-opening die holder. However, on a fast job, a few extra hundredths should be allowed.

A small interval of time is required for the spindle speed to be changed from 2,000 to 6,000 r.p.m. after the thread rolling operation is completed. The 10 revolutions shown will be found to be ample.

The required revolutions are now totalled. The answer will equal 100 hundredths, minus the 32 hundredths required for clearance. Stated in another manner, 343 revolutions equal

April, 1944

resu

catio

ishir

from

Disc

than

sign

spin

worl

give

of th

the s

of ch

prod

The

burri

enor.

you t

for h

prob

sales

Com

Right at the edge of a job well done!

Use of Slotted Abrasive Cloth Discs by Carborundum has resulted in amazing simplification of deburring and polishing operations on holes from 3/8" to 5 1/2" in diameter. Discs proportionately larger than the holes they are designed to deburr and polish are attached to power driven spindles. Pressed against the work, the discs cone, and give a true radius to the edges of the holes without touching the sides. It's a fine example of choosing the right abrasive product for the job.

the the

14be

ow evfor the 11 the the

ur-

he

ns

aid

ın-

or

nd

by

ıd-

ns.

he

5

hs

rt

C-

ed.

nd

vn

n-

r-

er

N-

n-

ed

bs

ne

d.

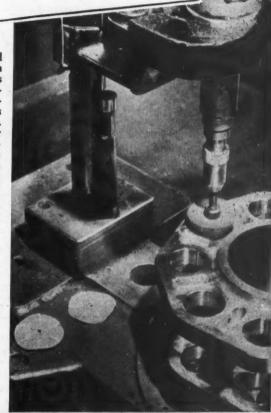
w 00 18

al

44

The use of abrasives in deburring, polishing, and in tool room work has seen an enormous advance in the last year or so. That's why we urge you to call on Carborundum Abrasive Engineering Service for help with your abrasive problems. Just call our nearest sales office. The Carborundum Company, Niagara Falls, N.Y.

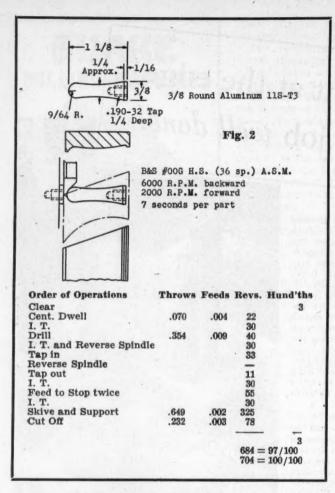
CARBORUNDUM ABPASIVE PRODUCTS



# Coated Abrasives by CARBORUNDUM

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum is a registered trade mark of and indicates manufacture by The Carborundum Company)



68 hundredths; therefore, 100 hundredths will equal 505 revolutions. Again referring to the Handbook on page 273, under the 6,000 r.p.m column, will be noted that 500 revolutions is the nearest available number. Under the column "Time in seconds to make one part," 5 seconds are shown.

Figure 2 shows a part which will require the use of a skiving tool. This can be realized at once by referring to the length of the part. It is ap-

parent that if the profile were produced with a forming tool, the part might break off during this operation. This would probably occur when the cut-off end of the part was being formed to its smallest diameter and the form tool would be bearing for the full length of the part.

By using a skiving tool, the greater part of the profile can be finished before the cut-off end has been reduced to its smallest diameter. At that time, approximately ¼ inch of tool surface only will be pressing into the work instead of the full width of the tool. This type of cut is obtained as shown in the chuck sketch in Fig. 2 by grinding an angle, usually 30

WIS

En

usi

16

26

wh

fro

SD

fin

deg., at the front of the skiving tool. After a careful study of the part drawing, the style of machine to be used may be chosen. A tapping operation is required; therefore, a B. & S. reversible spindle machine may be specified. The material is 11 ST aluminum, which is produced specifically for use in automatic screw machines; therefore a high speed machine will be used because this material can be cut more freely at the highest spindle speeds.



# HOW WE FOUND 12% Faster Finishing

REMOVAL of scale and press marks from the inside of 75 mm. steel cartridge cases was a bottleneck until the Rotor Application Engineer was called for an analysis. They were using 6-inch, 6000 R.P.M. Air grinders with 2½-inch wheels and home-made extensions.

the roi a the eak opi s bly

the

ng

its

ter

ool ng

th

iv-

1 e

of

be re id ed diat

of ly ng n-

ıll

ol.

is

m

k

2

n

80

1.

t

e

e

1

The R. A. E. recommended a small wheel type 16,000 R. P. M. Rotor Air grinder with Rotor 26-inch extension and 2½-inch "set-up" rag wheel. This increased surface feet per minute from 4,000 to 10,000. The rigid, one-piece spindle runs accurately and gives a smoother finish. Results:

- 12% faster production due to higher surface speed and smoother operation.
- 2. Improved finish.
- 3. Lighter tool; less operator fatigue.

Perhaps we could find similar economies in your shop with the *right* type of AIR or HIGH-CYCLE tools for the job. The R. A. E. is at your service!

Yours for the right tool,

AIR O'TOOL

AIR



CLEVELAND, OHIO

HIGH CACIE

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

## ABER CURVED TOOTH Millina Cutters



Patented

#### Staggered Tooth Right Hand and Left Hand Shear Side Mill

A Shearing Cut with "Chatterless Flowing Action"

Increased Production and Longer **Cutting Life** 

#### ABER PRODUCTS:

PLAIN MILLS STAGGERED TOOTH SIDE MILLS OVERLAPPING SIDE MILLS R & L HAND SHEAR SIDE MILLS R & L HAND HALF SIDE MILLS WOODRUFF KEYWAY CUTTERS CUTTERS UP TO 14" DIAMETER

Write for Literature

#### ABER ENGINEERING WORKS INC.

Waterford, Wis.

The size of the machine required to make this part will be a Brown and Sharpe No. 00G High Speed Automatic Screw Machine, because this size machine has a capacity of %-inch round stock, a turning capacity or turret movement of % inch, which is ample for the depth of drilling required, and a feeding stock capacity of 1 inch. To obtain the feeding length of 1% inch, it will be necessary to allow sufficient time to feed stock twice. From the above discussion, it can be seen that the No. 00G high speed machine has the necessary capacities to make this part.

In preparing the chuck sketch shown in Fig. 2, it will be noted that the circular form tool usually used has been replaced with the skiving tool. This tool is shown in two positions. The full lines represent the position of the tool when it is in its rear position, while position of the skiving tool at the end of its cut is indicated by the dot-dash lines. A cross section of the skiving tool is also shown to indicate how much of the profile of the part will be produced with this skiving tool. As indicated on the chuck sketch, the skiving tool will pass underneath the work.

The order of operations should next be considered. The first question to be determined is the possibility or desirability of producing the tapped hole after feeding out the stock, or whether the tapped hole should be machined in the chuck position as shown in the chuck sketch in Fig. 2. It will be quite apparent that the latter choice is the better of the two.

There are two reasons for this decision; first, it is always desirable to work as close to the chuck as possible, and second, a larger size machine would be required if the tapped hole were produced at the end of the part. because there would not be enough space between the end of the part and the front of the turret to allow for a drill or tap holder if the No. 00G size

April

d to and utothis inch or or h is recity igth 7 to tock n, it nigh caetch

that ised ring osithe its the t is A l is

of orondiing ork. ext to

deole her

ned the be ice

deto ssiine

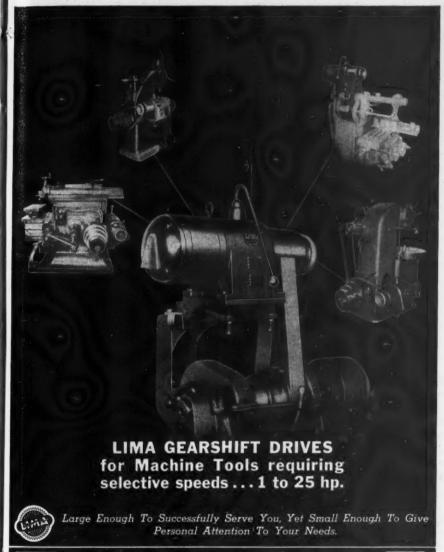
ole irt. gh nd r a

ize











#### 178 FINDLAY ROAD

LIMA, OHIO

REPRESENTATION IN MOST PRINCIPAL CITIES LIMA GEARSHIFT DRIVES - LIMA ELECTRIC LIMA MAGNETIC POLISHING LATHES - LIMA PEDESTAL GRINDERS



machine were specified. When it is considered that the difference in maximum spindle speeds between the No. 00G and No. 0G size machines is approximately one-third, it becomes obvious that the production would be decreased by approximately one-third if the larger machine were specified.

The order of operations begins with clearance time which is required to allow the cutting off tool to drop back before the centering tool comes into position. This is followed by the centering, drilling, and tapping of the hole. The stock is then fed out to the stop. Two feedings are allowed because the maximum distance obtained with one feeding, which is 1 inch, would not be sufficient.

After the stock has been fed out to the turret stop, the turret is indexed. This is followed by the skiving operation. The stock is supported from the turret with a special tool which has a % hole to suit the stock diameter. It is customary to support the rod in this manner for most skiving operations.

After the skiving has been completed, the part is severed from the bar. It would be possible to start the cutting off operation while the skiving cut was still in progress, but the saving in time would be small; therefore, for this job, the cutting off operation will start at the completion of the skiving cut.

The throw for the centering operation will require 0.010 inch to approach the work and 0.010 inch for each 1/32 inch of hole size. A centered hole sufficient for a 0.190-32-thd. tap will be provided. The drilled hole for the tapping operation will require 0.010 inch to approach, plus the depth of the tapping, plus three times the pitch of the thread or 3/32 inch.

The skiving throw is computed in two steps, as shown in Fig. 3, and the cutting off throw will be the total





VARD INC.

144

diameter.

PASADENA 8, CALIFORNIA

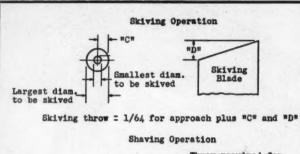




Fig. 3—Plan for Determining Throw Required for Skiving Operation

of the approach, plus half the diameter of the stock, plus the depth of the angle of the cut-off tool, plus 0.005 inch for the heel of the cut-off tool to pass the center line of the spindle.

The feeds for centering, drilling, and cutting off the part may be found on page 248 of the Handbook, while the feed for skiving will be based on the width and depth of the cut. For this part, a feed per revolution of 0.002 inch has been selected.

The number of cutting revolutions is now figured by dividing the number of feeds into the throws. The

number of revolutions required for tapping out of the hole at the fast speed will be eight plus three extrá revolutions for withdrawing from the work. For tapping into the work, which takes place at one-third of the maximum or base speed, the 11 revolutions will be multiplied by the spindle ratio of 3 to 1.

GR

Mil

mil

of

no

wit

Cu

the

Ca

WE

of

COL

ab

fan

pri

The number of revolutions required for indexing the turret and feeding the

stock is shown on page 273 of the Handbook, to which a few extra are added to aid in setting up the machine. The clearance time required for the cut-off tool to drop back and the center drill to advance into cutting position is shown in Fig. 2 as 3 hundredths. This figure will be found to be ample for estimating purposes.

The revolutions should now be totalled. This figure equals 684. However, the clearance time required before the centering operation is shown as 3 hundredths of cam surface; therefore, the 684 revolutions will be



SPI

tough

April



SPEEDS AND FEEDS that surpass those used in woodworking are now possible in metalworking
... WESSON Carbide Tools are machining the new, tougher, harder metals faster . . . with finer finishes . . . to closer tolerances for higher precision . . . at

less cost than ever before in history. With WESSON Carbide Cutting Tools, less frequent re-grinding is required . . tool life is longer . . production is stepped up, while costs are knocked doson. Truly, this is "The Carbide Age" of progress in industry!

evo-

ut of the ll be

hree ions

ving

ork.

into

hich

at

the

pase

rev-

the

of 3

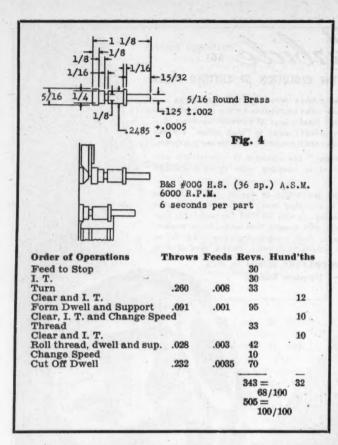
of of

e -

lexet the the are nared ind ut-3 3 ind es. to-Woe-

wn ce: be

be



multiplied by 100 and divided by 100 minus 3 or 97. The answer is 704 revolutions and on page 273 of the Handbook, under the 6,000 r.p.m. column,

it will be noted that the nearest available number of revolutions is 700. At the column to the right it is shown that 7 seconds will be required to make the part.

Figure 4 shows a part upon which a shaving operation will be required because of the close tolerance on the 0.2485-inch diameter. A circular form tool can be used to rough form this diameter to approximately 0.005 inch larger than the finish size. The shaving operation will then produce the close dimension shown. A circular form tool in a well-maintained single spindle machine should consistently produce

a diameter with a tolerance of plus or minus 0.0005 inch, but for any closer tolerance, a shaving operation is usually required.



#### HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long soughta more accurate and surprisingly faster way of trans-

ferring blind screw holes.

The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in 1/4" to 1" diameters. Send for price list.

HEIMANN MFG. CO.

330 Lincoln Ave.

Urbana, Ohio

noted arest umtions e colright hat 7 e reake hows hich oerarese of olerthe iamcular n be ugh ameroxiinch the The ation duce mencir-

ol in ined maconduce s or oser

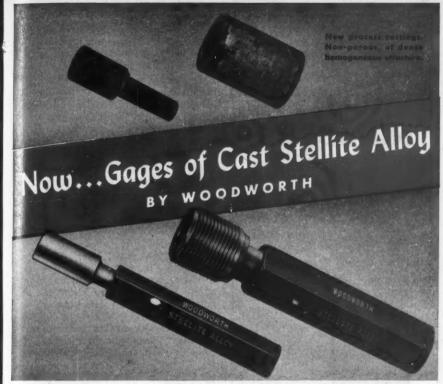
usu-Y

Sα 0 0 t.

1944

lo





#### Gage Life Increased From 5 to 15 Times!

Tough, high-wear resistant gages of a new cast Stellite alloy . . . by Woodworth . . . have a service life many times that of steel.

A positive contribution to the art of precision gaging . . . cast Stellite alloy gages were developed by Woodworth engineers after months of exhaustive research into new processing methods . . . testing in specially built wear-test machines, plus actual use in Woodworth manufacturing plants.

Stellite alloy gages are noncorrodible and non-magnetic . . . have low co-efficient of friction, low affinity for other materials and a co-efficient of expansion close to steel . . . with other important characteristics. Write for folder 44-S.

ACCURACY YOU



CAN TRUST

# VOODWORTH

N. A. Waadworth Co., Sales Division, 1300 E. Nine Mile Road, Detroit 20, Michigan

RECISION GAGES . GROUND THREAD TAPS . FORM TOOLS . PRECISION MACHINED PARTS . HEAT TREATING . PLATING

### QUICK MARKING

## PART NUMBERS



MARKING BY ROLLING IS FAST AND ECONOMICAL.

PRESERVES DIE LIFE AND PIECE PARTS.

REQUIRES ONLY FRAC-TION OF APPLIED PRESSURE AS COM-PARED TO STAMPING.

> QUICK SET-UPS

MODEL 25 HI-DUTY MARKING MACHINE

This machine operates from your plant air line, and is one of numerous models built to produce tast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

#### GEO. T. SCHMIDT, Inc.

1806 BELLE PLAINE AVE. CHICAGO 13, ILLINOIS

The material is hard brass, therefore a high speed machine will be chosen and the fastest available spindle speed will be used.

Assuming that all types of automatics are available, it will be advisable to choose a Brown and Sharpe Turret Forming Machine. This will allow the reversible spindle machines to be used when parts with tapping and threading operations are required.

A No. 00G high speed machine will provide a round stock capacity of % inch, a turning capacity of % inch, and a feeding length of 1 inch as shown ou page 258 of the Handbook. These dimensions will accommodate the part shown in Fig. 4.

It will be noted that the chuck sketch in Fig. 4 shows two positions. In the first position a sufficient length of stock is fed out to allow the circular form tool to complete its cut. This procedure is desirable in order to form as closely to the chuck as possible. Even though the part will be supported from the turret while the forming operation is performed, there would be a possibility of the part breaking off if the stock were fed out for the full length followed by the forming operation. It will be noted that the forming tool rough forms the 0.2485-inch diameter and cuts the 1/16-inch groove at the left end.

The order of operations may now be determined. As mentioned above, the stock is fed out part way, followed by a turning operation for the 1/4-inch diameter. Clearance time should then be allowed for the turning tool to be withdrawn and the circular forming tool brought into cutting position. During that time the turret is indexed and a support brought into location. The forming operation is now performed, the support bearing on the turned diameter. After the forming is completed, more clearance time is required for the forming tool

April



re-

be

to-

rpe

vill nes ing ed. vill of ch, as ok.

ck ns. gth cirut. der as vill cile ed, the

ere

by

be

gh

nd

eft

wo

ve, olhe ne

ar ooet ito is ng he

ce

ool 44

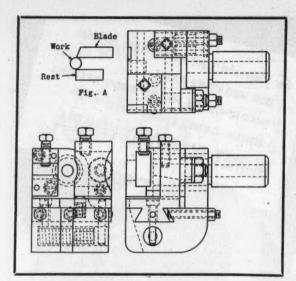


Fig. 5 — Turret Shaving Tool Holder Actuated by Special Guide Held Under Front Tool Post

positioned the tool in the correct location, the adjustable guide, held under the front tool post, advances and pushes forward the dovetailed portion of the tool. The shaving blade and the rest block are located in the rectangular slot in the dovetailed detail; therefore, when this unit is advanced, the shaving blade performs its operation.

After the shaving cut has been completed the adjustable guide drops

back, allowing the shaving blade and rest block to withdraw from the work. The turret is then indexed.

The construction of this holder allows the unit which carries the shaving blade and rest block to pivot slightly so that any inaccuracy in the holder is not transmitted to the work. It will also be noted that provision is made for a support to prevent the part from springing away when the shaving blade and rest block are advancing into the work.

The throw required for the turning operation will equal the 15/32 inch dimension plus .010 inch for the ap-

to drop back and for the next turret tool, which is a special shaving tool, to be indexed into position.

After the shaving operation has been completed, further clearance time should be provided to allow the shaving tool blade to be withdrawn from the part before indexing the turret. The stock is then fed out a second time, followed by the cutting off operation.

The special shaving tool used for this job is shown in Fig. 5. It is used in conjunction with a special adjustable guide similar to the B. & S. style of guide. When the turret has





the adnder advard of lade 10ular

de-

this av-

opcut the ops and ork.

alavvot the rk. is

the the ad-

ng ch ip-

5







proach. The form tool will travel from the A-inch stock diameter to the 1/4-inch diameter shown on the part drawing: therefore a travel of 0.094 inch will be required, plus 0.005 inch for approaching the work. The throw for the shaving operation is determined by making a layout as shown in Fig. 3. This will be readily understood when it is realized that the shaving blade advances over the work instead of cutting into the work, which is the customary procedure. The cutting off throw will equal 0.005 inch to approach the work, plus half the diameter of the stock, plus the depth of the angle of the cut-off tool, plus 0.005 inch to allow the heel of the tool to pass the center of the work.

The feeds should now be determined. The turning, forming, and cutting off feeds may be chosen by referring to the B. & S. Handbook. For a shaving operation, a feed per revolution of 0.0005 inch has been found to be quite satisfactory.

The feeds are divided into the throws to obtain the cutting revolutions and these are entered on the work sheet as shown in Fig. 4. The revolutions required to feed stock and index the turret are found by referring to page 273 of the Handbook. To the 25 revolutions shown, a few extra are added.

The clearance time required between the turning and forming operations will equal 8 hundredths of cam surface, according to information obtained from page 253 of the Handbook. When the forming operation has been completed, further clearance time should be provided to allow the front cross slide to withdraw to its maximum rear position before the shaving tool is indexed into position. This is to avoid the possibility of the shaving tool striking the top of the guide.

The front cross slide carries the circular tool post and the special guide

## It's NICHOLSON for Modern, Versatile



TYPE A-STEP JAW DESIGN

Especially adapted for holding work with short bores while being machined between centers on lathes, grinders, millers, shapers.

Size No.	Range of Bores Taken	Net Price
1A	1/2" to 1"	\$12.00
2A	1" to 11/4"	16.00
3A	1 1/2" to 2"	23.00
4A	2" to 3"	34.00
5A	3" to 4"	40.00





TYPE B-STRAIGHT JAW DESIGN

Adapted for work with short and long bores.

Size No.	Range of Bores Taken	Net Price
IX	1/3" to 18"	\$10.00
2X	to 21/32"	11.00
3X	21/32" to 3/4"	12.00
00	3/4" to 1/6"	14.00
0	%" to 1"	16.00
1	1" to 11/4"	18.00
2	11/4" to 1 1/4"	21.00
3	1 % " to 2"	29.00
4	2" to 21/2"	40.00

(Other sizes taking up to 7" bores.) Hardened tool steel, accurately ground. Sold singly or in sets. Prompt delivery. Bulletin No. 1043.

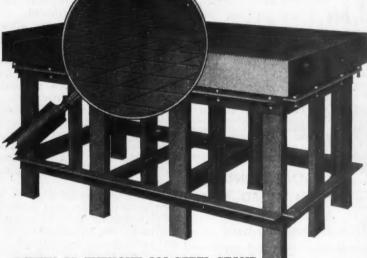
W. H. NICHOLSON & CO., 136 Oregon St., Wilkes-Barre, Pa.

### **USE CHALLENGE LAPPING PLATES**

CHALLENGE LAPPING PLATES meet the exacting

CHALLENGE LAPPING PLATES meet the exacting demands of ACCURACY and LONG, TROUBLE-FREE LIFE. Specifically designed to assure perfect fit when lapping metal-to-metal joints on which no sealer is used. Ideally suited for use on crank cases, cylinder heads,

end bells, gear housings and other parts which must be lapped perfectly to avoid oil leaks.



• WITH OR WITHOUT ALL-STEEL STAND

Made of finest semi-steel, specially heat treated and carefully machined. ½16" grooves ½" apart run full length and width of the surface. The arc-welded stand is optional. Equipped with closely spaced lock leveling screws assuring perfect level at all times. Wide range of surface sizes from 24"x36"x4" to 36"x72"x6".

INVESTIGATE BEFORE YOU INVEST . . . and write for complete details.

1893 50 TH 1943

THE CHALLENGE MACHINERY CO.

the olu-

The and fer-To

tra

een

ons

IIP-

in-

ok.

een n e ont xi-ng is iv-de. he de



This unbreakable hand blade may be used under awkward sawing conditions or by inexperienced men with satisfaction and fast-cutting speed.

MOLYBDENUM

HIGH SPEED STEEL

Write for our 3-minute desk top demonstration.

American Saw & Mfg. Co. Springfield 1, Mass.

which will actuate the shaving tool: therefore enough hundredths of cam surface will be allowed for the cross slide roller to drop down from the top of the cam to the smallest diameter. Five hundredths is required for this movement. Time for indexing the turret is then provided.

After the shaving tool has been indexed, time should be allowed to bring the dovetailed portion of the shaving tool forward until the blade is in cutting position. This movement is comparable to bringing the arm of a swing tool forward, therefore the four hundredths usually allowed for this

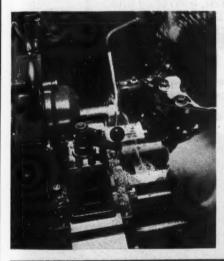
movement will be provided.

The clearance shown after the shaving operation is completed allows the shaving blade to withdraw from its advanced position to a position where the shaving tool can be indexed away from the work without any danger of the blade striking the shoulder of the piece. For the above movement, 3 hundredths of cam surface is allowed. This could be determined by layout work with the use of cam template and cam levers, although for estimating purposes, the 3 hundredths is sufficient.

All the revolutions are now added. The hundredths are also totalled. The 465 revolutions equal 77 hundredths; therefore, 100 hundredths will equal 604 revolutions. In referring to page 273 of the Handbook, it will be noted that under the 6.000 r.p.m. column the nearest number of revolutions to 604 is 600. Under the column at the right, it is shown that 6 seconds will be required to make this part.

"How to Make Your Standards Last Longer" is the title of a booklet containing valuable information on the proper offered by the Dearborn Gage Co., 22038 Beech St., Detroit, Mich. Copy will be sent free to individuals addressing a request on their company letterhead, giving their title or position.





Users of ground high speed tool bits may now try a MO-MAX Bit without cost or obligation. Your "Cleveland" Distributor or your nearest "Cleveland" Twist Drill stockroom will gladly send a Service Representative on request to bring the Bit to you.

Such trial service in your plant will establish the high cutting-tool effectiveness of MO-MAX High Speed Steel which is once again available now that restric-tions on its output have been removed. Tests have shown an average of about 20 percent more work per grind per tool than bits made of other high speed steels.

FORMULA	F	C	H	8	-	G	E	d	Ü	Ę	Л	u	Ā	Ļ	(	P	U	L	u	N	þ	8	E	1	N	S	è	8	4.7
Carbon															,														.8
Molybdenu	m																												8.5
Tungsien .																													1.5
Chromium																													4.0

MO-MAX High Speed Steel is backed by ten years of successful use, and in established as a standard for quality and quentity production. If your requirer steel supplier dessair have MCAMAX High Speed Steel contact any one of the fourteen loading teel steel producers lated below.

Technical data book brought up to datel Send for your copy of this new booklet which has been completely rewritten to explain the application and use of MG-MAX High Speed Steel.

Address: The Cleveland Twist Drill Co., 1242 East 49th Street, Cleveland 14, Ohio.



		THEY'RE	ALL MU-MAX		
'IMW"	Allegheny Ludium Steel Co.	Molite 8	Columbia Tool Steel Company	"Tatmo"	Latrobe Electric Steel Co.
"Mohican" "Bethlehem HM"	Atlas Steels, Ltd. Bethlehem Steel	"Rex T Mo"	Crucible Steel Co. of America	"8. T. M."	Steel Co.
Mo-Cut"	Company Brasburn Alloy	"Di Mol"	Henry Disston & Sons Inc.	Mo Tung"	Universal Cyclops Steel Corp.
	Steel Corp.	"Rex T Mo"	Holcomb Steel Co.	"Vul-Mo"	Vulcan Crucible
Star Max"	Carpenter Steel Co.	Mogul	Jessop Steel Company		Steel Co.

ool: am oss the lest red ing ining ing utm-

a

our his the WS om ion

ced

ny

ul-

ve-

is

by

m-

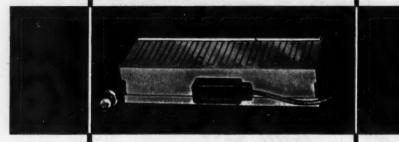
for hs ed. he 18: laı

ge ed nn to he

ill

ust ner ng 38 be d.

### WALKER MAGNETIC CHUCKS



Walker presents a complete line of Magnetic Chucks for modern equipment . . . Rectangular, Swiveling and Rotary Types in all sizes.

"THE BEST WAY TO HOLD MOST WORK— THE ONLY WAY TO HOLD SOME WORK."

Also belt or motor-driven DC and portable AC Demagnetizers.

Write for Catalog W-7



O. S. WALKER CO., INC. WORCESTER; MASS . U. S. A.

230

Apri

# Producto

#### DIE SETS

For all war plants producing dies for power presses or for any metal stampings or plastic moulds, PRODUCTO is ready to serve you. Hundreds of combinations are available at our factory and assembly plants. Accuracy and interchangeability of all components in Producto, Die Sets makes it easy for the tool and die maker. Our 100-page catalog tells the story. Contact our factories below or Die Supply Company, Cleveland, Ohio; Jamison Steel Corporation, San Froncisco and Los Angeles.



#### OTHER PRODUCTO

Dowel Pins — Die Springs —
Stripper Bolts — Machine
Vises — Socket Screws, etc.
Dickerman Automatic
Press Feeds.



OVERHANG TYPE



REGULAR TYPE



ALL STEEL TYPE



4 PIN DIE SET



The PRODUCTO MACHINE COMPANY

990 Housatonic Ave., Bridgeport, Conn. 3017 Medbury Ave., Detroit, Mich.

# FEWER PARTS LESS WEAR



# GUSHER COOLANT PUMPS

Because they're simple in design Gusher Coolant Pumps are trouble-free, highly efficient and long lasting. No metal-to-metal contacts, thus making continuous handling of grinding compounds possible. There's a type and model for your requirements. Write for complete new catalog.

MODEL 9040—Available in any current characteristics, including 25 cycle, 1, 2, or 3 phase. Totally enclosed ¼ h.p. motor.

### THE RUTHMAN MACHINERY CO.

THE "GUSHER"-A MODERN PUMP FOR MODERN MACHINE TOOLS.

232

Mod

acti

spe

the

our

Taj

Ma

Apri

# HELPING To Win AMERICA'S PRODUCTION BATTLE

by providing better, faster, more accurate threading



#### 4 WEEKS' DELIVERY

• Murchey self-opening dies and collapsible taps are speeding up production schedules on threaded parts for tanks, guns, bombs and shells. And by giving this extraordinary short delivery they are getting these schedules started much more rapidly. The record of these tools is outstanding.

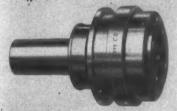
Write for literature on type "C-O", type "G" and on our New Collapsible Machine Tap Type "B-M". Also for folders on Murchey Milling Machines, Shell Tapping Machines and Roller Pipe Cutting-off Machines. You need this literature for ready reference.

Address Dept. M3

MURCHEY MACHINE & TOOL CO.
DETROIT 24, MICHIGAN

Type "G" (non-rotating) SELF-OPENING DIE HEAD — Designed and engineered for use on any machines where die heads de not rotate. Made in sizes from 7/16" up to and including 6".

Type "C-O" (retating) SELF-OPENING DIE MEAD—a companion to type "O" for use on machines where the die head revolves. Takes the same chasers as well as many parts of type "O".



MURCHEY

her

hly

-to-

ous

ssi-

our

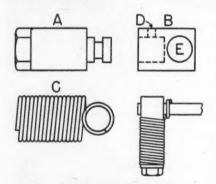
ew



#### Ratchetless Ratchet Wrench

WHEN inspectors and maintenance men in the induction furnace department at General Electric's Schenectady Works found it necessary to reach a considerable number of hollow-head screws in out-of-theway places, Inspector Raymond Hodge solved the problem by devising a "ratchetless" ratchet wrench of small diameter.

The usual ratchet wrench has a toothed wheel and pawls; the "ratchetless" one depends on the clutch ac-



Drawing of "Ratchetless Ratchet" Wrench

tion of a tightly coiled spring that permits one-way rotation only.

The body of the wrench is composed of two cylindrical parts, as shown in the drawing at A and B. The wrench was made to accommodate a ½-inch hexagonal head, but any adapter may be used in place of the hexagon for other screws. When part A is inserted in B, a pin through D and extending into the groove of part A permits free turning without separation.

Spring C, it will be noted, is tightly wound on a mandrel slightly smaller (0.005 in.) than the diameter of the parts A and B. The spring is pressed over parts A and B, with the loop of the spring over the drilled hole E. Inserting a 5/16-inch rod through the loop and into the hole E locks the looped end of the spring with respect to B.

If the spring is wound clockwise, then any clockwise turning of the rod tends to tighten the spring, to tighten the grip of the spring on A, and hence to tighten the hollow-head screw. Turning the rod counterclockwise loosens the coils of the springs, permitting B and the spring to turn without turning, or loosening A. By a series of short back-and-forth movements of the rod it is possible to drive the screw.

If the coil is wound counterclockwise, then such a back-and-forth movement removes the screw.

Mr. Hodge provides two wrenches for the work—one with a clockwise-wound spring for use as a driver and painted red for easy identification, and the other with a counterclockwise-wound spring for removing the screws.

Apr

g

# KELLERFLEX

# WORKS WHERE NO OTHER TOOL CAN REACH

A Shop Foreman recently told us: "I keep several Kellerflex Machines on tap for use in emergencies. Oftentimes there's no other way to get a job out ... we simply pull the Kellerflex over to the work, install the correct tool . . . and it reaches right in where no other tool can work. For that reason alone. I wouldn't be without these handy, tough little machines." But the main use for Kellerflex Machines is on day-in and day-out production jobs. In war shops all over the nation they are grinding, sanding, burring, polishing . . . doing jobs that no other tools can do so easily, so cheaply. They are available in a complete range of sizes from 1/8 H.P. up to 3 H.P. for immediate delivery. Every Kellerflex purchased now is an excellent investment for the peacetime years to come. Write for details.

Here is the heavy-duty 2 H.P. Kellerflex DL 6 . . . ideal, for heavy grinding, sanding, or polishing jobs where plenty of flexible shaft POWER is required.



### PRATT & WHITNEY

Division NILES-BEMENT-POND COMPANY KELLERFLEX SALES DIVISION WEST HARTFORD, CONN.

April, 1944

but e of

Vhen ough

e of

htly

aller

the

ssed

p of E.

the

the

pect

vise,

rod

ence rew. wise percurn By

ove-

rive

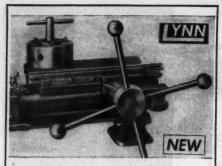
ck-

orth

hes iseand and

ise-

he



### BT-2 WITH PILOT WHEEL HEAVY DUTY BED TURRET

Converts ordinary lathes for screw machine and turret work. Easily, quickly mounted. Built for all types of lathes, bench or others, with swing from 9" to 13".

Self-indexing for fastest possible production. Sturdy pilot wheel has maximum leverage (10 to 1), gives smooth, easy operation for precision work—ideal for women oper-

ators.

Extra heavy turret head, 6" diameter. Long turret travel, 5½ inches. Tool holes designed to bore out to 1". Ground and hardened indexing parts; hand scraped bearing surfaces. For complete information write for bulletin 1215.

Complete line of bed turrets and selfindexing tool post turrets for large lathes.

Distributed nationally through jobbers Immediate delivery from stock or factory on standard makes

#### LYNN SELF INDEXING TOOL POST TURRETS

All Working Parts Enclosed

For lathes from 12" to 28" swing. Holds 4 tools. Self-indexing to 8 positions. Hardened indexing pin and inserts. No cams to wear. Solid steel blocks—sizes 514", 6½" and 8".



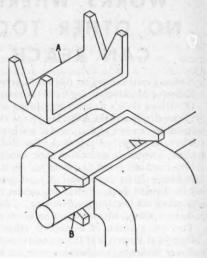
#### LYNN MANUFACTURING CO.

220 Elroy Street Minneapolis 8, Minnesota

#### Simple Attachment Holds Work in Bench Vise

By A. H. WAYCHOFF

USUALLY the bench mechanic is up against it when he has to hold a piece of rod or pipe in the ordinary bench vise. Even with copper jaws, which provide additional gripping power, the workpiece will slip if



Device for Holding Cylindrical Work in the Vise

any amount of pressure or torque is put upon it.

The drawing shows a simple attachment that will readily enable one to hold cylindrical pieces in the vise. The device is made from a piece of flat iron, which should be about one-quarter inch thick for the vise with three-inch jaws. The iron can be thinner for smaller vises.

The iron section should be about 1½ inches wide, and the ends should be bent at right angles to the back, as shown in the drawing. A V-notch is sawed out of each end, as shown, taking care not to get the notch so deep as to weaken the device. When

each tools operation locat

EOU

oper.

April,

April, 1944



EQUIPPING WORKERS with the fastest, safest, most accurate tool for every band tool operation inevitably results in better, faster workmanship. Tools poorly adapted to each specific application waste time, skill, energy. Everywhere in industry, Snap-on tools are giving added efficiency to manpower in production, assembly and maintenance operations. Snap-on's direct-to-user tool service is available through 35 factory branches located in key production centers. Write for catalog of the complete Snap-on line.

SNAP-ON TOOLS CORPORATION, 8032-D 28th Avenue, Kenosha, Wis.

is old ry vs, ing if

lise

is

to se. of neith

out

ıld

ck,

ch vn,

SO

en 944 the ends have been formed, the device should be long enough so that a visejaw will easily slip between the ends.

To use, the rod or pipe is placed in the V in the ends, then the device and rod are clamped between the jaws of the vise with the back of the device against one jaw-face and the rod against the other. The moveable jaw will crowd the workpiece into the V and hold it so that, if the jaws have been clamped tightly enough, it will

#### Alnor PYROCON

the contact pyrometer for quick accurate surface temperatures

This convenient, all-purpose surface temperature pyrometer is ideally suited to a variety of industrial plant needs. Accurate temperature readings are obtained in a few seconds, of plastics, liquids, oils, and similar materials, and of flat or curved, stationary or moving surfaces.

Built in several standard ranges, 0-300 deg. F., to 0-1200 deg. F. Write for Bulletin 3811 giving complete descript on.

ILLINOIS TESTING LABORATORIES, INC. 420 NO. LA SALLE ST. . CHICAGO 10, ILL. neither slip nor roll.

The device is especially valuable for holding cylindrical work in a drill press vise while drilling, and will quickly pay for itself in savings on broken drills and increased accuracy on the holes.

#### Spring Type Clamp Milling Fixture

By ALEX S. ARNOTT

MILLING small pieces of work us-usually presents two problems; loading and unloading the work without difficulty, and the holding the work securely during operation while at the same time avoiding setting up distortion in the material. The accompanying illustration presents a design of a milling fixture which will overcome both problems and, at the same time, provide for quick action in clamping the work.

The body A may be a casting or may be made from machine steel. A key B keeps the fixture aligned with the milling machine table. The length of the clamp C should be evenly proportioned from the centre. The pin K holds the clamp in position preventing it from turning, and the ends are rounded to give a good clamping surface. The machine nut D fastens the clamp to the bar L a shoulder on the bar being provided so that the clamp



#### HIGH SPEEDS

can be maintained because center revolves with the work in double row preloaded precision bearings.

April, 1944

nes

diff

sam

the

moi

grap

383 (

New April,

# "ROCKWELL" Superficial

for

will on acy

usms: iththe hile up acwill the tion or vith gth oropin ent-

are

the

the

mp

d

e e d

S.

944



The advantage of using the "Superficial" type of "ROCKWELL" Hardness Tester for sheet metal lies in the ability of that machine to test pieces of different thicknesses all on the one hardness scale. It will test the heavy samples properly and also test accurately sheet metal that is far too thin for the regular type of "ROCKWELL" Tester to handle.

Notice the small weights that characterize the "Superficial" type. The more sensitive depth measuring system employed does not show in a photograph.

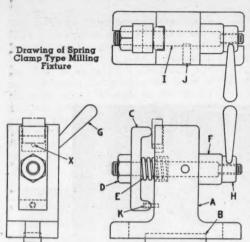
Conversion Charts On Request

383 Concord Ave. New York 54, N. Y.

April, 1944

WILSON

MODERN MACHINE SHOP



is fixed between the shoulder of the bar and the machine nut. The spring E is made to suit the work and pushes the clamp away from the work when the clamp is not in use. A spacer F, loosely mounted on the shaft L keeps the nut and the handle away from the body of the fixture so that the milling cutter will not interfere with the handle G. The pin J prevents the shaft I from turning.

In operation, the work is mounted into a slot in the fixture body with a pin X to gauge it and the handle G is turned, causing the nut H to draw the shaft I toward the work and in turn clamping the work in the fixture.

The good features of this design are that the work may be removed quickly without inconvenience to the operator, and the handle is clear of the cutters and is easly operated.

#### Understanding Behaviour of Hinged Motor

By W. F. SCHAPHORST

THE action of the hinged motor base, which is now so commonly employed, continues to be shrouded in mystery for many shop workers. Many operators watch these drives as the motor moves to and fro, but fail to understand why because, so far as this writer is aware, no one has taken the trouble to explain it to them.

The drawings herewith show such a drive when idle, at the moment of





Reich 3-way surface test indicator has proven quality, performance and endurance for all set-ups: .014 reading. Write for folder. Price \$5.00 Plus Postage. Priority Rating Required. Write for

REICH MFG. Dayten 9, Ohlo 45 E. Stroop Rd.

REYNOLDS MACHINERY EDDY STREET, PROVIDENCE Incre

thev

used

carri

TE

et



Increase Tool Life—Handle heavier loads—permit deeper cuts at higher speeds because they rotate with the work. Built for precision jobs. Where standard inserts cannot be used, special inserts may be made to suit the requirement. Centers with Morse tapers carried in stock.

#### **ELECTRIC TACHOMETER**



Checks RPM instantly. Used as "Hand Type" or as "Separable Type" with generator separated from meter. Two Ranges—0 to 2500 RPM and 0 to 5000 RPM.

#### DEMAGNETIZER

A single pass across the Demagnetizer removes metallic dust, flakes, fine chips, etc. Keep Tools Sharp Longer. Powerful— Portable. Two sizes.

Write for FREE Machine Tool Catalog.





t I, ndle fixtter ndle naft

is ure and

tourn

debe onthe

r

tor

nly

in

as ail as en

of

244

IDEAL Sycamore



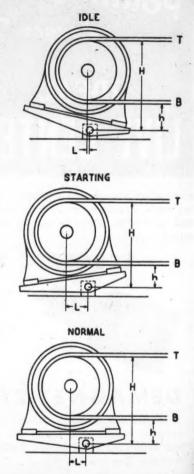
1031 Park Ave.

Sycamore, III.

Sales offices in all principal cities. In Canada: Irving Smith Ltd., Montreal, Quebec.



starting, and when operating under load. The lower side of the belt B is the tight side, and the top side T is the slack side. The tight side is con-



Drawing Illustrating Positions of Electric Motor When Idle, When Starting, and When Running

siderably closer to the pivot, as indicated at h, the slack side being farther away from the pivot as indicated at H. This means that the upper side of the belt T has a longer "lever arm" around the pivot; thus the tension in



How to get more out of your Broaches----

BY PROPER HEAT-TREAT

The difference between an ordinary broach and a really good one is frequently traceable to the heat-treatment before grinding. Of course, you can't take all your broaches and heat-treat them yourself for longer life. But you can make, sure that they are properly heat-treated.

One of the best ways to do this is to check into your broach supplier's heat treating equipment.

As a starter, we will be glad to tell you about our new, modern and complete Heat Treat Department. It will give you an idea why Colonial Broaches do such an outstanding job.

Ask for a copy of Broaching News-Vol. V, No. 2.

COODIAI BROACH COMPANY DETROIT 13, U.S.A.

Broaches Broaching Machines-Broaching Equipment

Same of the vertical and horizontal Host Treat Furnaces at Colonial.





April, 1944

Motor nning indifarated side arm" on in

1944

ınder B is T is con-

MODERN MACHINE SHOP

the upper side determines the position of the motor.

When the drive is idle, the tensions in T and H are equal, the pull in B being less than when running and the pull in T being greater than when the motor is running; therefore the motor is pulled farthest over. Upon starting, the tension in T is practically nil while in B it is greater than at any other time; therefore the motor drops to its lowest point. When

running normally, the tension in T is a little greater than in B, and the result is that the motor is balanced in the "in-between" position.

In other words, the tension in the "slack" side of the belt is mostly responsible for the balanced position of the motor. Why? Because of its longer leverage.

#### IMCOLIGHT



#### **CARELESSNESS Often Traced** to FYF FATIGHE

Carelessness . . . errors . . . rejects . . . slowed-down production are often due to improper machine tool lighting! Many valuable man-hours can be saved by installing VIMCO-LIGHTS. Adjustable quickly to any position, they spot-light the work with non-glare, point-of-operation illumination. Send for circular. Vimco Manufacturing Co., 111 Chenango Street, Buffalo 13, N. Y

#### Offset-Type Carboloy-**Tipped Tool Conserves** Materials

IN CAR

Œ

The d

oiling

show

furnis

featur

cause

turns

This I preloc Logar

high s new c featur

April,

MPORTANT conservation of materials and machine hours has been effected by Thompson Aircraft Prod-

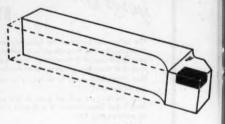


Fig. 1—Drawing of Steel Shank for Offset Carboloy-Tipped Tool

ucts Company of Euclid, Ohio-quantity producers of extremely precise parts for aircraft engines-by an ingenious method of making offset type Carboloy cemented carbide tools.



#### ADJUSTABLE SNAP GAGES IN STOCK Model A

#### PROMPT DELIVERY ON PLUG GAGES .030" to 8"

Extraordinary Improvement in Adjustable Snap Gages with Ball-tipped anvil and amazing positive locking system cannot get out of set—Pat. Appl'd for.

GOOD Prevent Spoilage Speed-Up Operations GAGES

**Utilize Less Skilled Help** Reduce Costs

EASTERN PRECISION GAGE CO.

HERSH TOWER BLDG., BROAD ST. ELIZABETH, N. J. Phone, Elizabeth 2-9519





e-

ts

en

d-

se

n-

oe

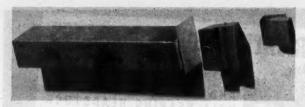


Fig. 2—Offset Carboloy-Tipped Tool Disassembled. Showing Parts

In making the ordinary offset tool, the usual practice is to make the tool in two pieces—the tip and the shank. To make the offset it is necessary to mill off the side of the steel shank as shown in the accompanying sketch Fig. 1. At TAPCO, however, such tools are now fabricated from three separate pieces; a head, a shank, and the Carbolov cemented carbide tip. Both head and shank are of cast Meehanite for all types ¾ in. or larger. Used standard tool shanks are also salvaged for this purpose when practical. The various parts going into the assembly are shown in Fig. 2, in-

cluding two sections of "Easy - Flow No. 3" sheet: the brazing metal used in the operation.

The head is cast in such a shape that it is ready to receive the tip. This eliminates milling to produce the offset saving both machine hours and material and also reduces the amount of machining necessary to provide a recess in the shank for the insertion of the carbide tip. The Carboloy tip can be placed on either the right or the left side of the head. Thus the same heads can be used for either right or left hand offsets.

To braze the various sections of shank, the cemented carbide cutting tip, and so on, the parts are assembled and clamped in a vise as shown

#### To Speed Victory! WE ARE READY TO SERVE YOU!

#### **Cold Pipe. Conduit and Tube Bending Machines**

Twelve types to select from. Hand operated capacities 34 to 6' inclusive, Motor operated 1/2 to 8' inclusive,

A few of our More Than 12,000 Customers:

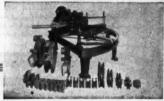
Bureau of Ships, Wash., D. C.; Henry J. Kaiser Co., Calif.; Pacific Bridge Co.; Bethlehem-Hingham Shipyards; Hercules Powder Co.; Stone & Webster Engineering Corp.; E. I. Du Pont de Nemours & Co.; Louisiana Shipyards; Westinghouse Elec. & Mfg. Co.; General Motors Corp.; Carnegie-Illinois Steel Corp.; Henry Ford Company.

**Quick Deliveries** 

25 PEARL ST. BOSTON, MASS,



Write Air Mail for printed matter



April

### THIS BOOK Will Help You



slash cost and time on many Surfacing Operations

# Precision Abrasive Belt Surfacers

are taking over many tasks formerly assigned to millers, grinders, shapers, lathes—and turning out the work faster

—5 to 25 times faster—WITH SUPERIOR FINISH.

Wet-Belt Surfacing works an entire area, as large as 9" x 17", with one presentation to the belt. Final finish is produced while taking the cut. Wet-Belt Surfacing is a precision method—tolerances of .0005" can be met by ordinary operators. It eliminates heat, discoloring, dust, distortion, flow, chipping. It works on any material; handles most jobs free-hand. Jigs, whenever they're required, are the simplest design. Set up time greatly reduced.

LEARN MORE ABOUT IT! Send today for our new booklet, which is virtually a treatise on one of the biggest machining aids to come out in years.



### PORTER-CABLE MACHINE

PORTER-CABLE MACHINE CO.
300-4 WOLF ST., SYRACUSE, N. Y.
Please send me a copy of "A New Precision Machining Method."

Name

Company ......Title.....

Address ......State.....

oloy-

ons of . 3" metal

on. shape e tip.

e the s and nount ide a crtion y tip ht or s the either

tting

sem-

hown

tter



Fig. 3 — Tool Assembled and Clamped in a Vise for Brazing

in Fig. 3. The brazing operation is then performed by using a torch. Brazing of carbide tips is not at all difficult and requires only the provision of the simple brazing equipment available in most shops.

These 3-piece offset tools as prepared at TAPCO provide another large source of materials conservation, since it is possible to use the same shank over and over again. When the tool has be come worn out or obsolete the old head can be removed and another head and tip brazed on the same shank. Head removal is

Yes

sho

mo

lar

we

dre

RFC

thre

can

eas

yea

bee thro

new I

April.

accomplished by clamping the tool in a vise and heating with a torch for a minute or so until the head drops off. •

This procedure saves material and machine time both when fabricating the final tool and when the tool is "worn out" or obsolete and it is necessary or desirable to separate the carbide tip from the shank.



THROUGH THE EN

bled

the m e lete

be

ther

ink.

tool

rch

and

ting

l is

car-

ls t-

y.

E.

1944

is

of a Need

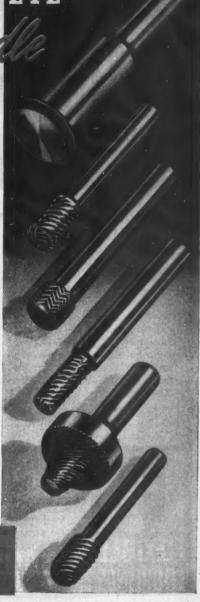
Yes; this RFC HAND-CUT ROTARY FILE—shown at the right—is used to remove the bur from the eye of a large needle. Unusual? Perhaps. But we consider it merely one of the hundreds of "special" precision jobs that RFC rotary files are performing daily throughout industry.

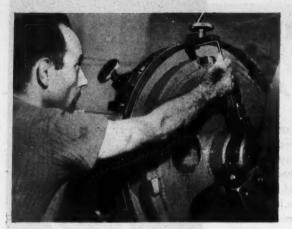
Don't say a tricky little operation of stock removal, cleaning or finishing can't be done ... fast, thoroughly, easily, and with closest precision ... until you've consulted RFC. For over 20 years, starting with the first modern-type rotary files developed, RFC has been teaching rotary files to jump through all kinds of hoops.

Much of this comes under the head of RFC special service—on which you pay no premium whatever. The new RFC Catalog tells all about it. Write for your copy.



The ROTARY
FILE COMPANY
STRATEGICAL CONN.





Concentric Alignment Gage in Position for Checking Concentricity of Workpiece on Horizontal Boring Machine

#### Concentric Alignment Gage for Horizontal Boring Machine

A CONCENTRIC alignment gage devised at the General Electric Company's Schenectady Works has simplified the task of quickly centralizing the outer rims of circular pieces for subsequent boring operations. Previously, the alignment check had to be made by securing a bar in the machine spindle and then revolving the spindle.

The gage is clamped to the machine spindle by means of a hinged collar and screw, as shown in the illustration, and a metal scriber is positioned in the mounting block at the end of the offset arm. An indicator could be attached, if desired, for this or other possible applications.

The gage is designed to be used in either of two ways: the spindle gear can

can be disengaged and the spindle, with the gage clamped tightly to it, rotated by hand or by the "jog" method to check concentricity of the skirt. Or, if preferred, the spindle may be kept in gear and the gage clamping screw adjusted so that the collar or the entire gage rotates about the spindle.

The gage can be maintained on the spindle, always in readiness for final positioning.

Europe's plight should e'er remind us, We must keep our country free; Bonds bought will send ammunition To our boys across the sea.



250

#### ECONOMICAL WAY TO STEP UP YOUR POWER!

Correct misalignment, endwise displacement, etc., absorb shock, surge, and vibration with dependable L-R Couplings. No lubrication needed.

SEND FOR L-R CATALOG

Couplings 1/6 to 2500 h.p. Free Selector Charts.

LOVEJOY FLEXIBLE COUPLING CO.

5007 West Lake St. Chicago 44, III.



L-R Type "H"
4.60 to 806 h.p.
Pat. & Pats. Pend.

e in ntriconto

the etal the end in-

two
can
dle,
o'it,
og"
the
age
the
out

the

1944

GAMMONS REAMERS

Manufacturers of

The Gammons Helical Taper Pin Reams

The Gammons Helical Chucking Reamer

The Gammons Helical Die Makers Reamer

Special reaming problems invited

Send for Catalog

THE GAMMONS-HOAGLUND CO.

MANCHESTER

CONNECTICUT



#### "Thinkamerican" Posters

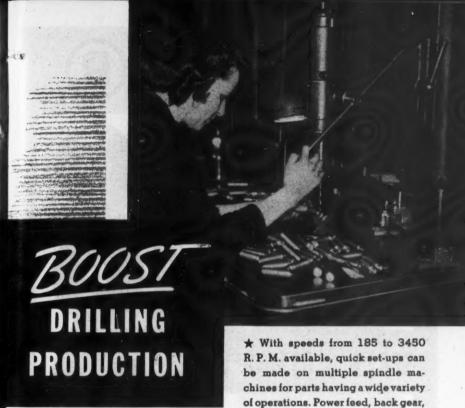
The poster reproduced here is one of a series that is now being supplied to approximately 6,000 business, industrial and financial organizations throughout the country by Kelly-Read & Company, Rochester, N. Y. The posters are intended to awaken all of us to the necessity of "thinking American"; to lead us to reflect upon the system of free enterprise upon which the prosperity of America was founded; to draw comparisons between the high living standards and freedom of action enjoyed by Americans with the poverty and restrictions which have become the lot of those who allowed government by dictatorship to assume control of their government, their industries, and their lives.

The posters are printed in attractive colors, on heavy material, of a size suitable for wall or bulletin board display. Full information available from Kelly-Read at the address given above.

Pure Oil Product Bulletin No. 61. Published by The Pure Oil Co., The Pure Oil Bldg., 35 E. Wacker Drive, Chicago 1, Ill., this 20-page illustrated bulletin is devoted to an outline of test methods employed to develop and evaluate cut-

ting fluids marketed by The Pure Oil Company and recommendations which, with all controllable conditions being correct, should result in increased tool life, improved finish, and maximum production. Copy free upon request.





R. P. M. available, quick set-ups can be made on multiple spindle machines for parts having a wide variety of operations. Power feed, back gear, built-in tapping and coolant furnish all the necessary attachments. Footburt Sensitives are rigidly built to drive cutting tools to their full capacity. Write for price and delivery information.

#### THE FOOTE-BURT COMPANY

CLEVELAND 8, OHIO
Detroit Office: General Motors Building

MOVE UP THE SCHEDULE A WIN THE WAR QUICKER

FOOTBURT
Sensitive
DRILLING MACHINES

here now roxidusnizaoun-The

neneriflect enthe was pariving

cans striccome wed ship their ries,

d in eavy able disvailthe

Oil nich, eing tool pro-

??

# CIRCLE (R)



### SCREW SLOTTING SAWS

Used by most of America's larger screw manufacturers, these Circle R saws are made of selected high speed steel. Like all Circular Metal Cutting Tools they are designed by specialists to successfully accomplish the most exacting operations.

Complete stocks of these sizes are available.



For detailed information on these and other Circular Saws send for Catalog K. NOW!



134" diameter



21/4" diameter



23/4" diameter



® CIRCULAR TOOL CO., Inc. ®

PROVIDENCE 5, R. I.

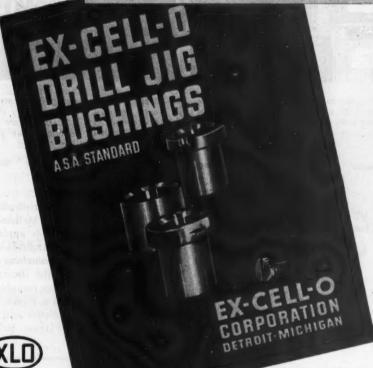
CHICAGO . PHILADELPHIA . NEW YORK . DAYTON . CLEVELAND

LOS ANGELES : ROCHESTER : INDIANAPOLIS . DETROIT . ST LOUIS

254

April, 1

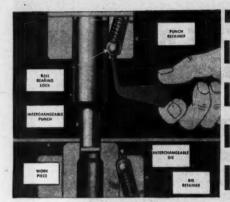
### FOR THE BUSHING you NEED

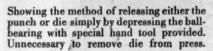


check this book!

Ex-Cell-O Bulletin 11882 will help you select your drill jig bushing requirements. Send for It today.

**EX-CELL-O CORPORATION** Detroit 6, Michigan







Special punch retaining plates are made where center distances are too close to use standard retainers. Hole sizes can be changed without affecting plate pattern.

Dervice with a bunch!

BY RICHARD BROTHERS-SOLE PRODUCERS OF THE ORIGINAL INTERCHANGEABLE PUNCH AND DIE

For years the patented Interchangeable Punch and Die of Richard Brothers' Division of Allied Products Corporation has been in the service of the metal working industry-delivering a knock-out blow to production delays and high labor costs. Today it

has become the accepted standard of efficiency in the field of laminated plastics as well. The wide application and money-saving possibilities of this "first aid" to multiple punching operations is indicated by the illustrations on this page. For a more complete preview of "Service with a Punch" write for the R-B catalog. Better still, bring your blueprints or layout problems direct to us.

"IT'S AN ALLIED PRODUCT!" - Allied Products Corporation and its divisions, Richard Brothers and Victor-Peninsular, in Detroit and Hillsdale, Michigan, also make: Sheet metal dies, steam-heated plastic molds, jigs and fixtures, cold forged parts, production parts, aircraft engine and gun parts, and other special precision products.

BUY WAR BONDS

Executive Office: 4646 Lawton Ave., Detroit 8, Mich. All four plants have now added a star

to their Army . Navy "E" Pennants

# OC

# WRENCHES & PULLERS make BIG JOBS easy

Tough, heavy machine repair jobs are simplified and speeded up with OTC Sledging Wrenches and OTC Heavy Duty Pullers. OTC TOOLS are proving their dependability in many factories, mills, mines, power plants, and R. R. shops—as well as in the Army, Navy and Merchant Marine.

OTC engineers are experts in designing special wrenches and pulling tools to meet specific needs . . . Write us about your requirements.

OWATONNA TOOL CO.

OWATONNA, MINNESOTA



ets Cor-Victoro make: igs and craft enroducts.

made

se to

an be

ttern.

rd of

nated

f this pera-

e prewrite bring

TS o N s, Mich.

il, 1944

# NEW SHOP EQUIPMENT

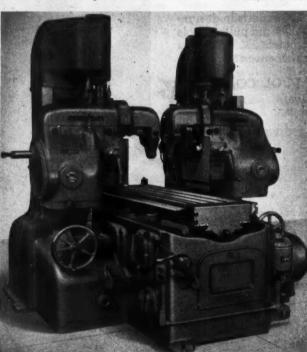
#### Cincinnati Tracer Controlled Hydromatic Milling Machine

Designed to meet wartime needs for accurately controlled milling of profile shapes, the Cincinnati Tracer Controlled Hydromatic Milling Machine now being offered by The Cincinnati Milling Machine Co., Cincinnati 9, Ohio, has the same basic structure as standard Cincinnati Hydromatic heavy duty production type milling machines but provides a sensitive, tracer controlled vertical movement of the spindle carrier. According to the manufacturer, accurate duplication of master profile templates is obtained automatically without attention on the part of the operator, and automatic table cycles, synchronized with spindle carrier vertical movements, reduce the efforts of operation to that required to load and unload the workholding fixtures.

The automatic, hydraulic tracer mechanism, mounted on the spindle carrier, controls the vertical position of the spindle carrier during the cutting stroke of the table. A roller on the end of the

tracer valve mechanism engages the master profile template attached to the work-holding fixture. As the table moves, the roller moves along the top of the template, and any vertical movements of the tracer valve, imparted by the roller, are automatically duplicated in magnitude by the spindle carrier. Contact pressure between roller and template is naturally very light, since the roller has only to shift a hydraulic valve.

Table and spindle carrier movements are automatically synchronized in



Controlled Hydro-matic Milling

Cincinnati Tracer Muchine

258 MODERN MACHINE SHOP April, 1944

duplex April, 1

ing s permit

such alwa posit in th

the profil move varia extra camto pe movs widtl A

gage

trol a

Auto

ing f

in be

trace Tal

finite

single

way :

the :

eithe:

vidin

produ

of mi

by h

table

in ei

single

friction ing ca

The

moun

and c

pletel

only f

is sm fortle

hydra

contro

positi

nite n heavil

struct

ting 8

away

in the

chip e easily with 1 The droma a wide left-ha

All parts lubric

The

such a way that the spindle carrier will always be in its uppermost or retracted position before the table can move at the rapid traverse rate and, conversely, in the lowered or cutting position, with the tracer roller engaging the master profile template, before the table can move at the feed rate. An automatic variable feed attachment available as extra equipment provides automatic cam-controlled variations in feed rate to permit constant maximum metal removal regardless of variations in the width and depth of cut.

A selector valve provides for disengagement of the automatic tracer control and permits the use of the machine for heavy duty production type work. Automatic table working cycles, combining feed and rapid traverse of the table in both directions, are retained when

tracer control is disengaged.

Table feeds are hydraulic and are infinitely variable under the control of a single throttle-type lever. Since two-way feed cycles are standard features of the machine, cuts may be taken in either or both directions, thereby providing the advantages of continuous production by the reciprocating method of milling. When operating the machine by hand controls for set-up purposes, table feed or rapid traverse movements in either direction are selected by a single four-position lever.

The spindle is mounted on four antifriction bearings, with the front bearing carrying the radial and thrust loads. The rear support bearings are sleeve mounted to permit normal expansion and contraction on the spindle. Completely anti-friction mounted and having only four gear contacts, the spindle drive is smooth and efficient. Practically effortless starting is accomplished by a hydraulically actuated clutch mechanism controlled by a lever at the operating

position.

TORAL.

ıli-

b-

on

to-

ith

re-

at

rk-

eh-

er,

in-

of

h-#

he

m-

to

ng ta-

11-

he

te.

cal

moll-

tiin

he

er.

ire

nd

tu-

ht.

as

y-

dle

nts

lly

in

944

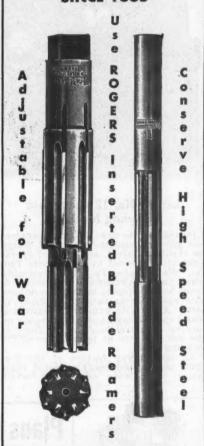
All important bearings and moving parts of the machine are automatically lubricated. All castings are of Meehanite metal, generously proportioned and heavily ribbed to provide a sturdy, rigid structure for smooth, vibration-free cutting at maximum capacity. Chips fall away freely through recessed openings in the top of the bed, and the spacious chip compartment in the bed itself is easily cleaned out without interfering with machine operation.

The Cincinnati Tracer Controlled Hydromatic Milling Machine is available in a wide variety of sizes. Both right and left-hand headstocks, with corresponding spindle carriers, are available to permit construction in either plain or

duplex styles.

## ROGERS

**SINCE 1885** 



Align and concentric down to %" diameter.

OUICK DELIVERY!

JOHN M. ROGERS TOOL CORP.

GLOUCESTER CITY

NEW JERSEY



#### Landis No. 12 Centerless Grinding Machine

Landis No. 12 Centerless Grinding Machine

Designated as the No. 12, a centerless grinding machine of rugged design for thrufeed, infeed, and endfeed operations is announced by the Landis Tool Co., Waynesboro, Pa. The regulating wheel base is completely self-contained. Drive to the spindle is from an adjustable speed motor through multiple Vbelts. An infinite number of regulating wheel speeds may be obtained merely by turning a control knob at the front of the bed and with no interruption of the grinding cycle.

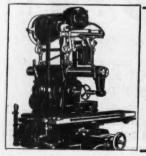
An outstanding feature of the machine is a hydraulically operated regulating wheel base cross slide which facilitates the dressing of the regulating wheel by virtue of the fact that the wheel face is traversed across the point of a positively held diamond. The wheel dresser is so mounted that the path of contact between the regulating wheel and the diamond is the same as the path of contact between the regulating wheel and the work.

When thrufeed grinding, no readjustment of the dresser is required when the tilt of the regulating wheel base is altered. The hydraulically operated cross slide further provides a means for accurately aligning work rest blades. Another advantage is that the regulating wheel base may be traversed by means of a screw adjustment at

the front of the bed as well as hydraulically, thus permitting quick axial alignment of the regulating wheel with the grinding wheel.

The regulating wheel base may be swiveled for the grinding of tapers, thus eliminating the need for truing the regulating wheel when changing over from one taper to another or from a straight surface to a taper surface or vice versa. The regulating wheel base may also be tilted as required when thrufeed grinding.

Like the regulating wheel base, the grinding wheel base is completely self-contained, with the drive through multiple V-belts to the grinding wheel spindle. Landis Microsphere bearings are used for both the grinding wheel spin-



### Plans for peacetime profits

How fast you change over and get to the thick of postwar competition may hinge on your ability to produce at low cost. Maybe we can help you. Find out now how others have cracked down on costs thru installations of Remco Motor Drives. Nothing else like them. Investigate, write for free folder. Remco Products Corp. State and Hay Sts., York, Penna.

#### REMCO MOTOR DRIVE

for LATHES, SHAPERS, DRILLS, MILLING MACHINES, ETC.

There are FORM RELIEVED "TOMAHAWKS"

Genesee Tool Company is one of the few major tool companies completely equipped to produce in quantities both ground and unground form-relieved cutters of virtually all types—on short deliveries (6 to 8 weeks at the time this was written).

Thousands of these "TOMAHAWK" formrelieved cutters have been doing Yeoman's duty in turning out better war products.

We will be glad to quote you on your requirements.

GENESEE TOOL COMPANY





ling

the of

e is of a The ited beand the the ork. no r is the red. ited s a ing ading l by tat uli-

gnthe

be

ers,

ver a

or

ase

hen

the

elfnuloinare

oin-

dle and regulating wheel spindle.

A rigid work rest is mounted directly on the machine bed. To make setup easier for thrufeed grinding operations, a series of elevating screws is provided under each end of the work rest blade.

A main control grouping at the front of the bed places complete control of the machine within easy reach of the operator. Included are a master start button for all electric motors a master stop button for all electric motors, and a motor selector switch which, when properly turned, provides a work set-up stage, a grinding stage, and a dressing stage. Of great importance in this connection is an arrangement whereby the regulating wheel speed automatically increases for the dressing operation when the selector switch is turned to the dressing stage and automatically slows down to the grinding speed when the selector switch is returned to the grinding stage.

Both wheel dressers are controlled from the main control grouping. Two large selector knobs are provided and within each of these is a small knob which is used to regulate the speed of the dressing operation. The grinding wheel dresser is hydraulically operated. and a profile bar may be used when

form work is being ground by the infeed method.

The design of the Landis No. 12 Centerless Grinding Machine includes & built-in 60-gallon capacity coolant reservoir with two baffles for settling the sediment and so arranged that cleanout is convenient. The machine is also equipped with a one-shot lubrication system. A large handwheel with mi-crometer dial makes possible grinding wheel feed settings in tenths in terms of work diameter reduction. All electrical control equipment is mounted in a separate, fully enclosed compartment in

Net weight of the machine, including electrical equipment, is 8,000 lb. A 15 h.p. constant speed grinding wheel drive motor is used.

#### Peerless Improved Metal-Cutting Power Saw

An improved metal-cutting power saw of streamlined design is announced by the Peerless Machine Co., Racine, Wis. Features of the machine include a hydraulic micro-set gage mounted on conveyor for accurately determining the



### MACHINE ILLUSTRATED

is a 4-Spindle Hydraulic Machine, equipped with four pump-type jigs for Line Boring . . . Piston-Pin Hole in piston.

E TOOL & DIE CO. Detroit 11, Mich.

7356 St. Aubin,



NOPAK Model R. 2-3-and 4-way Foot Valve with spring return may be adapted to a wide variety of operating cycles.

# NOPAK Foot Valves Leave Both Hands FREE!

Foot control of air or hydraulic machine movements has proved valuable in speeding up production on a wide variety of applications. It leaves operators' hands free for other tasks, reduces fatigue. NOPAK 2-, 3- and 4-Way Foot valves are built in Spring Return, Ratchet and Double-Treadle Types, affording various operating cycles for the control of single and double acting air or low pressure hydraulic (either water or oil) cylinders. Write for Bulletin 86.

GALLAND-HENNING MFG. CO., 2758 S. 31st., Milwaukee 7, Wis.

OPAK Representatives in Principal Cities
VALVES and CYLINDERS DESIGNED for AIR or HYDRAULIC SERVICE

NOPAK Model F. 2-3-and 4-way Foot Valve with ratchet pedal is particularly adapted to applications where operator must leave valve location after applying pressure.



A 4342-1P-A



connected in line with the center of the frame so that driving force is always centrally applied.

Vi

ga

\*\*

trally applied.

All parts of the Peerless Improved Metal-Cutting Power Saw are readily accessible for easy cleaning and adjustment. The 7 and 11-inch automatic models can be adapted for handling single bars or nests of bars or tubes. The Peerless Power Saw is available in a variety of models and sizes to meet high speed precision sawing requirements.

Progressive Storage Battery Welder

A direct current resistance welder using storage batteries as a source of

welding current has been announced by the Progressive Welder Co., 3050 B. Outer Drive, Detroit 12, Mich. Advantages claimed for the machine include elimination of inductive losses in the welding "loop," elimination of reactance losses between power supply and electrodes, and easy operation and maintenance by semi-skilled workmen.

Particularly useful in localities where power supply is limited, the Progressive Storage Battery Welder is said to require only sufficient power (either single or three-phase a.c.) to operate a battery charger. The charger is a dry-disc type rectifier having automatic controls. At the welder itself, only a simple (non-synchronous) sequence welding control

length of cut; vernier finger-tip screw control for adjusting feed pressure to accuracy of ounces; 75 per cent greater oil capacity for feed unit; four-sided saw frame which completely surrounds the blade and the work; backing plate which supports the blade to permit the application of maximum feed pressure with minimum strain on the blade; and 60 per cent greater chip capacity to provide for fewer clean-up periods.

In addition, the eight bearings on which the saw frame and guide travel have been enlarged. These bearings have ground and renewable inserts. The saw frame is balanced during its reciprocating travel by dual hydraulic cylinders. The driving rod to the saw frame is

### **NEW - WHIP TOOL GRINDER**



Sharpening milling cutters, lathe tools, and many other small tools. Holds diamond while dressing wheel, straight or radius. Holds in locked position to desired degree or angle.

WHIPPLE MFG. CO. Spirit Lake, Iowa

# QUALITY SMALL PINS QUICK

TAPER — STRAIGHT — DOWEL
.030" TO .125" DIAM.
.125" TO 2" LENGTH
CONCENTRIC CHAMFERED
OR FORMED ENDS

COMMERCIAL CENTERLESS GRINDING CO.

6605 Cedar Ave. Cleveland 3, Ohio

# VERSATILE...

ing

he

hat en-

ess

ac-

ng

els

ng

rer

ety

ng

ce

of

B.

n-

de

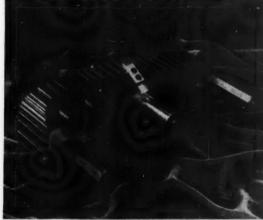
Sometimes a company gets a reputation for producing one particular item better than it can by made by others.

Vinco, pioneering involute splines and their inspection, is known, nationally, for the excellence and accuracy of the involute spline gages made here. Vinco's Involute Checker and Vinco's Dividing Head have been considered "tops" by many key companies using them.

But this is not all that Vinco excels in. Every type of fixed limit gage is made by Vinco with the same unerring skill; fixtures of many kinds and —well, the list is long and is partially shown at the bottom of this page. Look it over and you will probably see items you didn't know were made by Vinco. And remember that 1000 Vinco craftsmen work together to produce Vinco quality.

VINCO CORPORATION 8861 SCHAEFER HIGHWAY • DETROIT 27, MICH. Sules Offices in NEW YORK und CHICAGO



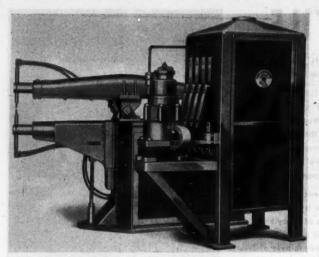




### MILLIONTHS OF AN INCH FOR SALE BY V I N C O

Semi-Automatic Hydraulic Spline and Gear Grinder Optical Master impacking Uniciding Negal \* Invadure Charles Angle Tangent in Kadius Diesser

Index Plates \* Precision Vises \* Sine Pars \* Shorijahiside Spline, Serration Spline, Invadure Spline and Helical Spline Play and Ring Gages \* Propeller Hold Gages \* Built-up and Special Gages \* Gear
Plays, Rings and Setting Play Gages \* Special Hold Master Gears \* Munition Gages \* Propeller Hold Gages \* Built-up and Special Gages \* Gear
Rulling Fishers \* Spline and Index \* Enteres \* Hydraulin Proper Control Utilization and Ostribution Units \* Engineering Design and Development



is needed, which, together with an automatic pressure switch on the machine and a "starting" pedal-operated switch, controls the weld cycle.

Control of the actual amount of welding current is provided by a contactor-

controller, which is said to be capable of making and breaking tens of thousands of d.c. amperes at low voltage without arcing and of controlling. the current with but one adjustment—that of "pressure." Its principle is that of the well-known "carbonpile," although pressures in the contactor may be as high as 25 tons when welding aluminum for instance. (Usual factory air-line pressure is said to be sufficient to provide this pressure when required.) When

the pressure in the contactor drops to zero, current automatically stops flowing, thus making possible interruption of the welding current without arcing.

In addition, since the design of the Progressive Storage Battery Welder is

# WHITNEY- JENSEN PRODUCTS

# NEW! No. 38 BENCH SHEAR

A small, powerful, throatless type shear with capacity up to 3/16" mild steel. Cam action provides straight up - and - down blade travel. Length of blade 5". Size overall 11" x 8¾ x 7½". Weight 45 lbs. All parts interchangeable for easy replacement. Write for circular.



# NEW! No. 162 SHEAR

For cutting off angle iron up to 3" x 3" x 1/4" clean and square with no distortion of ends.
Double cut b I a d e shears both sides, Ball Bearing Screw Action provides maximum power with minimum effort. Easily operated by one man for bench or floor use.





No. 5 JR. Punch A handy tool for all sheet metal workers. Capacity 1/4" hole in 16 ga. iron. Will punch in center of 4" disc. In metal kit box complete with 7 punches and dies.

WHITNEY METAL TOOL COMPANY

April



Order by STOCK BLANK

giving Pitch and Thread Form desired

DETROIT

STANDARD STOCK BLANKS MEET 90% OF ALL THREAD MILLING CUTTER REQUIREMENTS



FOR STANDARD STOCK SIZES, ASK FOR BULLETIN No. CB-43





1 54

1.36

8432 BUTLER DETROIT 11 MICH. U.S.A.

10

of ng of w cng ut at 8 he ngor

25 ıg

n-y is

to

re n

to g,

ie

ie is

223 224 225

said to provide for elimination of induction losses in the welding loop, current passing through the weld is claimed to be exactly the same regardless of how deeply a panel is inserted in the throat of the welder, thus assuring weld consistency. Of particular importance in plants where other forms of equipment aside from welders are being operated is the fact that the storage battery welder is said to operate with virtually unity power factor, thus making unnecessary the installation of corrective electrical equipment in the plant to compensate for high momentary loads on the power line.

### GRAY TURRET HEAD METAL CUTTER OR NIBBLER



GRAY, Originator of First Practical Metal Cutter or Nibbler

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

GRAY MACHINE CO. Box 596, Philadelphia, Pa.

WALTHAM,



### **DeWalt Tube Cutting Machine**

Designed for straight and angle cutoff or slotting operations on ferrous and nonferrous tubes, bars, formed and extruded shapes, the DeWalt Tube Cutting Machine shown herewith is now being



**DaWalt Tube Cutting Machine** 

produced by DeWalt Products Corp., Lancaster, Pa. Using saw blades, the machine is said to cut ferrous metals up to ½-inch wall thickness and nonferrous materials of heavier cross-sectional areas. Using abrasive wheels, solid bars up to 1½ inches in diameter can be straight cut.

Features of the DeWalt Tube Cutting

# GEARS GOOD GEARS ONLY

All Kinds—Any Quantity
AT THE RIGHT PRICE
THE CINCINNATI GEAR CO.

THE CINCINNATI GEAR CO.

Wooster Pike Cincinnati, Ohio

# GET BIG PRODUCTION FROM UNSKILLED WORKERS!

**BOICE-CRANE** 

ut-

exing

he

up

us

rs be

ng

SAFETY ENGINEERED
PRECISION - BUILT
SHOP-TESTED

**POWER TOOLS** 

You can get QUICK DELIVERY from Boice-Crane

# Perform Production Miracles with the

# BOICE-CRANE No. 2600 HELMET HEAD DRILL PRESS

Over 75 Models

One, two, three and four spindle types. High and slow speed; bench or floor type; slotted or oil-trough table.

Perfectly balanced. Vibrationless.

Sealed against hazards common in other presses. The only drill press under \$100.00 with an approved guard; the first guard that allows easy speed changing.



Five carefully predetermined efficient speeds, one for every operation. New self-centering 30-degree pressure angle 6-tooth involute spline. Spindle, quill, and spindle-pulley are held in permanent, perfect alignment.

The longer, larger diameter quill is supported in head by three long bearings, permitting more accurate deep hole drilling than by other presses in same price range. The most durable, sensitive press in its class.

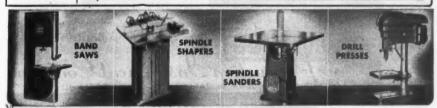
FOR FREE 48-PAGE CATALOG USE THIS COUPON

BOICE-CRANE COMPANY · 937 Central Ave., Toledo, Ohi	BO	ICE-CRANE	COMPANY		937	Central	Ave.,	Toledo,	Ohi
---	----	-----------	---------	--	-----	---------	-------	---------	-----

Name\_

Street\_

City.



April, 1944

MODERN MACHINE SHOP

Machine include a sturdy roller head construction; powerful, totally-enclosed, direct drive motor: rotating arm that permits motor and roller head assembly to be turned 360 deg. on 7-inch semisteel column; rotating vise assembly, controlled by air valve; conveniently located handle for adjusting cutter to desired elevation; heavy duty chain and sprocket construction with crank for controlling movement of roller head and cutter; 25-inch motor travel for roller head; motor yoke assembly which permits operator to locate motor and cutter at any desired angle; degree dial plate mounted on motor to allow for quick locating of motor in yoke for desired bevel cut: push-button control for motor; adjustable safety guard which can be moved 360 deg. around cutter; prefabricated steel base; and various other features.

Principal specifications of the machine are as follows: motor, 3450 r.p.m., 10 h.p. or 1800 r.p.m., 5 h.p.; arbor hole size (3450 r.p.m., 10 h.p. motor), 1 inch diameter; arbor hole size (1800 r.p.m., 5 h.p. motor), 1¼ inches diameter; diameter of saw blades or abrasive wheels, up to 16 inches; floor space required for operating, 56 x 56 inches; floor line to highest point on machine (maximum

elevation), 74½ inches; floor line to highest point on machine (minimum elevation), 58½ inches; weight, approximately 2,100 pounds.

# Grant No. 3 Double-End Automatic Tapping Machine

Designed to tap work up to 28 inches in length, the Grant No. 3 Double-End Automatic Tapping Machine shown herewith has been introduced by The Grant Mfg. & Machine Co., Bridgeport 5, Conn. With the proper cams and tooling, the machine can also be used for hollow milling, drilling, and threading.

Since both ends of the work are machined simultaneously, one end can be hollow milled while the other end is being drilled; also, one end can be tapped while the other end is being threaded. The mills, cutters, die heads, or tapping heads are moved along the bed toward or away from the work in the center by large drum-type cams located at the front of the machine. The rods, or other work, are placed in magazine and roll by gravity squarely into feed fingers, the cam operated feed fingers



to eleoxi-

nes Ind rein: he ow nabe peipid-

p-

ed

he ed ds, ne ed

on

ıe

er

vy

ly

a-

at

Change-overs

\$197.50 immediate Delivery

# UTILITY TOOLS

In a matter of minutes you can convert your engine lathes into screw machines. Simply remove tail stock and install a Utility Turret and Crossfeed Cut-off. Turret has rack and pinion which assures steady feed. Raised bearing surface eliminates all chip trouble. Has two taper gibs for take-up and alignment. All ways and bearing surfaces are ground. All inserts, bushings and pins are hardened and ground. Hex is 51/6" across flat, 2-7/16" thick. Accommodates a 3/4" hole or a No. 1 or 2 Morse taper. Fits Logan, South Bend, Atlas, Craftsman, 10" Sheldon, Clausing, etc.

Cross Slide pictured here has rack and pinion, two tool holders with adjustable jacks. Weight approximately 40 lbs.

Collet Closer parts are hardened and ground. Full ball bearing. Only wear is on ball bearings. Write for detailed literature.



\$55.00



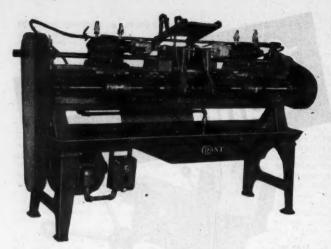
DIEMFRS

1370 West Washington Blvd.
LOS ANGELES 7, CALIFORNIA

\$60.60

April, 1944

MODERN MACHINE SHOP



Grant No. 3 Double-End Automatic Tapping Machine

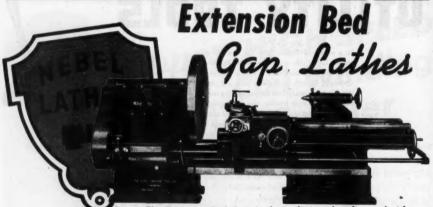
the tapping operations on each end. Following this, the tapping heads with-draw far enough to provide the necessary clearance for the finished work to be automatically ejected and the next piece successive placed in the working position. This cycle is repeated for each part, the machine being fully automatic.

The main drive to the spindles is from a motor located be-

neath the bed. The drive is through a silent chain and two spur gears to a spined shaft in the rear which, in turn, connects through gearing to the spindles. By changing the two spur gears in the main drive, the spindle speed may be varied to suit different diameters or materials.

conveying each successive rod from the bottom of the guides of the magazine to a position between the clamping jaws.

The forward clamping jaw is then advanced by a cam and, when the work is firmly gripped, the tapping heads advance toward the work to perform



Illustrated is the Series
"AG" 20/40" Extension
Bed Gap Lathe. Also made
in 28/50" Heavy Duty.

The Extension Bed Gap Lathe is designed to be used either as a gap lathe or an engine lathe.

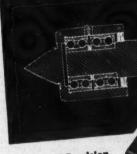
We also manufacture a line of regular geared head engine lathes.

Write for circulars.



April

PROVEN TODAY . . . . FOR TOMORROW'S PRODUCTION



d.

to sor k

r i-

n

dsy

4 Rows of Precision
Ball Bearings

# QUADRO Precision LIVE CENTERS..

QUADRO Precision LIVE CENTERS will outlast old-fashioned solid centers to pay for themselves quickly. They combine the rigidity of the solid lathe center with the frictionless properties of the ball-bearing solid lathe center with the frictionless properties of the ball-bearing to form a tool which will increase production without sacrificing accuracy. Manufactured in all tapers and sizes.

DAKON

TOOL AND MACHINE CO., INC.

BJB BROADWAY NEW YORK J. N. T.

The main cams which operate the tapping heads may be adjusted along the cam shaft for locating the tapping heads according to the length of the work; also, the two center bearings can be moved along the cam shaft. According to the manufacturer, the machine is protected against damage by an ingenious spring and ball detent type of clutch which slips from one position to the next if, for example, a piece should be caught between the unrecessed part of the clamping jaws.

Specifications of the unit are as follows: height from floor to center of tools, 43 inches; maximum capacity between taps, 28 inches; height of spindles above bed, 5 inches; height overall, 53 inches; width overall, 23 inches; length overall, 85 inches; floor space, 23 x 85 inches; diameter of spindles, 2 inches; maximum diameter piece that can be tapped, ¾ inch; maximum length of cut, 2¼ inches; horsepower motor required, 3 h.p.; speed motor required, 1,150 r.p.m.; maximum diameter tap in steel, ¾ inch; maximum diameter tap in brass, ½ inch; shipping weight of machine, 2,450 pounds.



1

Will Cut 1" and Smaller Wire Rope.

A compact, handy machine built for endurance.

Price \$80.00 Weight 110 lbs. Catalog No. 8 Available.

T. H. LEWTHWAITE MACHINE CO. 317 E. 47th St., New York 17



### Waltz Model CH Heat-Treating Furnace Unit

Designed for the performance of complete heat-treating jobs, the Waltz Model CH Heat-Treating Furnace Unit illustrated herewith, product of the Waltz Furnace Co., 2466 Gilbert Ave., Cincinnati 6, Ohlo, includes a high temperature hardening furnace on the left, quench tanks in the center, and a recirculating draw furnace on the right. The unit is available in three sizes; namely, 8 inches wide x 6 inches high x 12 inches deep, 10 inches wide x 8 inches high x 15 inches deep, and 12 inches wide x 10 inches high x 18 inches deep.

The temperature in the hardening furnace is automatically controlled by an indicating pyrometer that can be hand set to hold any temperature in the range of 1,350 to 2,300 deg. Within the muffle or heating chamber, a protective atmosphere (to prevent scaling and soft skin) can be introduced. This atmosphere is controlled by two valves located beneath gages on the control panel of the furnace unit. These gages provide means for duplicating the atmosphere once the type needed has been established. Efficiency of operation is said to be main-



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS Wilmerding, Pa.

274

April,



Attached without additional machining to these surface grinders:

BROWN & SHARPE ROBOT REED NORTON ABRASIVE DO-ALL TAFT-PIERCE HAMMOND and other similar surface grinders.

Send for Circular

LIBERTY TOOL & GAGE WORKS INC.

237 GEORGIA AVE.

PROVIDENCE 5, R. I.

omorrow's Tools for Today's

Z

h K

0 8

n d

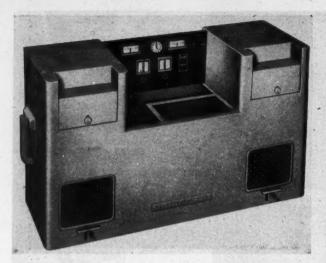
e e

()

S

h

e



Waltz Model CH-Heat-Treating Furnace Unit

one for water, the water er entirely surrounding the oil tank through double walls. Both tanks are equipped with perforated baskets.

The recirculating draw furnace has a range of from 250 to 1,100 deg. which is controlled by an automatic indicating pyrometer similar to that on the hardening furnace. The interior of the draw furnace is of alloy steel, around which is a cast insulating lining that, in turn, is protected by an outer shell of steel.

mov

aga

pres

Inside the furnace, the hot air for tempering, which is heated by a unit in the base, is recirculated by a high velocity alloy steel fan, also located in the base.

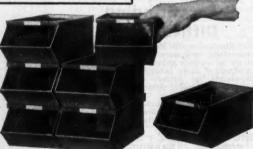
loy steel fan, also located in the base. The outside shell of the Waltz Model

tained due to 7-inch thick walls of fire brick and block insulation.

Two quench tanks are provided in the center of the Waltz Model CH Furnace Unit. a small one for oil and a larger

We have been given permission by WPB to manufacture Stackbins to be used as portable containers for production and assembly.

Save Time and Labor Handling Parts and Materials



Patented Stackbins keep parts and materials instantly accessible—eliminate waste hand motions—stack rigidly to form units

of exactly the right shape and capacity at the point of assembly — save time and labor handling parts and materials.

Write today for full details and prices on all-welded steel Stackbins.

STACKBIN CORP., 53 Troy St., Previdence, R. I.

STACKBINS

STACKED AND STILL ACCESSIBLE"

276

April, 1



A FEW CONSTRUCTION FEATURES . . . foot pedal switches; adjustable bolster; movable ram head; reset type hand switch and thermal relays protect motor against overload; can take work 54½" high; builds up from zero to 60 ton pressure in 4 seconds! Sturdy, compact, powerful!



r-

ls. p-

ıg

to

is 0-V-

of

of d ln y l.

#### AUTOMATIC PRESSURE CONTROL

The pressure control system reverses ram at any pre-set pressure, automatically continuing up and down ram cycle until foot switch is released. Automatic control holds spoilage to minimum, increases production speed.

\* ELECTRIC & HYDRAULIC MODELS

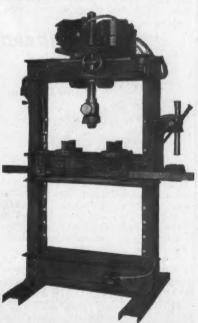
\* 20 TO 60 TON CAPACITIES

CEILING-PRICED

WRITE FOR SPECIFICATIONS

FRE

5717 Dunham Road • Bedford, Ohio, U.S.A.





### DUPLEX M-6 BAND AND DISC GRINDER

The latest in pedestal type grinders. Actually two machines in one! 14" disc for all rough work . . . 6 x 48" band for finishing. Precision-built to meet wartime production standards - quickly, economically!



This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood.  $4 \times 36^{1/4}$ " band. The ideal portable unit.

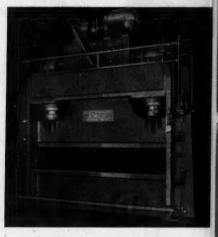
OTHER STYLES AND SIZES IN NEW BOOKLET ON FINISHING—WRITE TODAY

WALLS SALES CORP. 96 Warren St., New York, N. Y.

CH Heat-Treating Furnace Unit is of formed steel all-welded construction with air grills, as shown. The foot treadles in front are for opening the doors of the furnaces. All equipment necessary for operation is located inside the base and easily accessible. The entire unit is compact and complete, occupying only 33 x 98 inches of floor space in the small size and requiring but a gas connection and an electric power outlet.

### Beatty Hydraulic Straightening and Forming Press

A heavily-built hydraulic straightening and forming press of the closed housing type for general use in railroad



Beatty 400-Ton Hydraulic Straightening and Forming Press

car shops and other metal-working plants has been brought out by the Beatty Machine & Mfg. Co., Hammond, Ind. Available in capacities of from 100 to 600 tons, the machine is said to be par-ticularly suited for forming of press parts, V-bending, and straightening of armor plate, long lengths of shafting, and rolled shapes.

The press shown in the accompanying illustration has a capacity of 400 tons and is provided with a stroke of 8 inches. The bed measures 24 inches front to back and has a ½ x 1/2-inch key slot. The ram measures 7½ inches front to back and is provided with a 1/2 xelf

# DIA-BRASIVE



# THREE POINT DESIGN

Fashioned to Order Processed for Service **Built with Quality** 

W. F. MEYERS CO. INC.

1014 14th Street . Bedford, Ind.

with s in the for and

om-33 % size and

g

ensed oad

ng

d. to SS

of g,

ns

es

# BRADFORD METALMASTER LATHES

141/2" - 161/2" - 181/2" Swing

TOOLROOM AND ENGINE TYPES

.. Also ..



CAM FEED
UNIT TYPE
DRILLING AND
TAPPING
MACHINES

1840 - 1944

The Bradford Machine Tool Co. Evans at 8th St. Cincinnati 4, Ohio



A production tool, smooth in operation, engineered to fill a broad field where a fast bench unit can be used most advantageously. It saves time by taking the part to be machined to the grinder instead of taking the grinder to the part as in the case of a portable tool. It leaves the operator with both hands free with which to handle the work; the result, much more production. 3 stages of power.

WRITE FOR LITERATURE.

M-B PRODUC

130-134 E. LARNED ST. DETROIT 26, MICHIGAN inch key slot. The ram has an advance speed of 330 inches per minute, pressing speed of 20 inches per minute, and return speed of 385 inches per minute.

Additional specifications are as follows: operating pressure, 2,000 lb. per square inch; clear opening between housing, 123 inches; maximum opening, 18 inches; minimum die space, 10 inches.

### Chicago Chip Breaker Grinder Fixture

Manufactured by the Chicago Tool & Engineering Co., 8399 S. Chicago Ave., Chicago 17, Ill., the Chicago Chip Break-



Chicago Chip Breaker Grinder Fixture

er Grinder Fixture shown in the accompanying illustration is not only designed for use in grinding carbide-tipped

### **New Nesting Type Tote Pans**



20" long x 12" wide x 6½" deep. 16 ga., drag holes and handles both ends.

J. L. LUCAS & SON, INC.
Bridgeport, Conn.

April,

# INDUSTRY'S TOOLS OF WAR



# WRENCHES by BILLINGS

Wrenches have always been the production tools of Industry. Today, they are Industry's Tools of War!

The assembly of war and fighting equipment moves faster with Billings Wrenches in the hands of men who "know how."

It's our job to produce these Tools of War for Industry at "top" capacity. We're doing it!

YOU CAN RELY ON BILLINGS TOOLS



April, 1944.

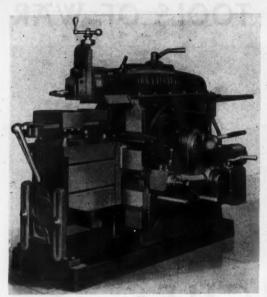
ing

are 123 es:

& e.,

MODERN MACHINE SHOP





tools but also for dressing grinding wheels and for precision grinding of small parts.

Easily and quickly adjusted, the fixture has three full 360-deg. graduated adjustments which provide for accurate tilting of the fixture to any desired angle. Positive locking of the fixture at all angles is said to be assured.

### Queen City 20-Inch "Super Twenty" Shaper

Production of a 20-inch shaper, designated as the "Super Twenty," which is said to be equally suited to heavy duty

and general toolroom work is announced by the Queen City Machine Tool Co., 217 E. Second St., Cincinnati 2, Ohio.

The ram, which is of the V-type, is provided with wide bearing surfaces on both bottom and sides, and the column is exceedingly well ribbed for sturdiness. All gears of the speed train are hardened and shaved. The main bull wheel gears and the back gear train are of helical design. The bull wheel is the two piece type. The clutch is a dry multiple disc type unit which is said to require a minimum of attention and adjustment.

The Queen City Super Twenty Shaper is provided with feeds ranging from a fine feed of 0.008 inch for finishing up to a hogging feed of 0.191 inch for the heaviestroughing. Feed changes

tion (

mach

ampl

tip t

and

re-tip

That

less

more perfe

If yo

minu

magi

cifico

avail

illust

listin

April, 1

can be readily made by simply turning a knob.

A high torque motor for the power rapid traverse is included as standard equipment of the machine. The motor is push button controlled from the operating side of the machine and may be operated even though the feed is engaged. Thus, in machining an irregular surface, the table can be fed through a portion of the cut and then by merely applying finger pressure to the power rapid traverse button, the table can be moved over to start the cut on the next surface.

An electrical limit switch is incorporated into the rail. If at any time the table is moved too far to either side,



Cut Set-Up Time
75% through use of the
New Advance Clamps
(the only T-slot clamps)
Clamp directly ever
work. For use on all
machines with T-slots.
Stendard and HeavyDuty type.

Write for circulars.

ADVANCE MACHINE WORKS
3727 Weisser Park Fort Wayne, Indiana







0-

ne

e.

ty













MACHINERY MANUFACTURING COMPANY

Vernon Line of HORIZONTAL MILLS, VERTICAL MILLS and JIG BORERS, SHAPERS and GRINDERS

this limit switch goes into operation, stopping not only the power rapid traverse motor, but also the main drive motor. The table support is designed to provide for maximum table stability not only when the table is positioned in the center of the rail, but also when the table is moved to the extreme ends. The support has a full bearing on the bottom of the table, and the foot extension covers the entire width of the base.

The Queen City Super Twenty Shaper is equipped throughout with Timken bearings. The vise furnished with the machine is of heavy, rugged construction, with hardened steel inserts for the jaws.

### Rubber and Synthetic Rubber Bushings for Insulating Pinion Gears from Shafting

Rubber and synthetic rubber bushings for insulating pinion gears from shafting so as to prevent transmission of noise, shock, vibration, and impact are now being marketed by Bushings, Inc., 3442 W. Eleven Mile Rd., Berkeley, Michigan.

The bushings can be inserted without the use of inner and outer metal sleeves or the performance of machining operations. In addition, no special preparation of shafting or gear or heating is required to insert a bushing which, after it is in position, is said to provide a mechanical bond of sufficient strength with the bore of the gear and the surface of the shafting to transmit the required torque. The size and type of bushing used depend on individual conditions, synthetic bushings being recommended for applications where lubricants are present.



# SAVED SPACE

Equip your shop with Yohe Storage Racks — Save floor space — Prevent damage to stock—Speed up handling. Yohe Storage Racks are cast of highgrade machinery iron and can be turnished in capacities of 10,000 and 12,000 pounds for storing bars 10 to 20 feet long.

Send for illustrated folder.

WM. S. YOHE SUPPLY CO. 505 Gibbs Ave. N. E., Centon, O.



is the basic weapon behind the firing line



MANY SIZES IN STOCK

SMITH TOOL & ENGINEERING CO. | 8 5 5 N. Sandusky Ave., Bucyrus, Ohio |

For Precision Accuracy you need SMITH MASTER SURFACE PLATES

PLAINER FINISH & LAPPING PLATES ALSO AVAILABLE

BR



FOR REDUCED FRICTION, EXCELLENT SHAFT CONFORMITY, AND QUALITIES OF SELF-LUBRICATION, SELECT . . .

... The exceptional quality high lead bearing that resists pounding and heavy shock, yet costs but little more than standard analysis bearings

For precision airplane parts, pumps, seal rings, high speed shafts and other services where freedom from shaft scoring and seizure are desired, specify "Buckeye Lubrico."

er on

e of

conomibri-

nio |

1944

Manufactured from selected metals under Buckeye's exacting laboratory and metallurgical control assures the production of sound homogeneous bearings having a thorough and uniform dispersement of lead throughout. These bearings are free from porosity and are accurately dimensioned within the required limits assuring speedy, easy assembly.

Buckeye Lubrico Bearings can be furnished in any of our 1088 standard stock sizes-in 13" cored or solid bars or in any OD, ID and length, slotted, drilled, flanged or threaded exactly to customer's blue print . . . in three different metal analyses to meet exactly the requirements of light high speed, general, and extremely heavy duty service. No order is too big or too small for Buckeye. Let us quote on your requirements.

Buckeye

BRASS AND MANUFACTURING COMPANY

6412 HAWTHORNE AVE

CLEVELAND, OHIO

BRONZE SLEEVE BEARINGS . STANDARD SIZES OR TO CUSTOMERS BLUEPRINT IN ANY RECOGNIZED BEARING METAL ANALYSIS



# SECOMET DIAMOND WHEELS

When the war is won—Americans will enjoy higher standards of living than ever before. Motor cars, airplanes, trucks and tractors, home appliances, every machine and tool that's made of metal, will be better, safer and stronger. JKS Diamond Wheels will help to make this possible by processing tougher metals, with greater precision. Far-sighted companies are already designing new products, scanning new outlets and perfecting plans for cutting their costs with improved machine tools. To such executives this is an invitation to write today to—



# Special Coolant System for Rogers "Perfect 36" Vertical Turret Mill

A special coolant system for the Rogers "Perfect 36" Vertical Mill is announced by Rogers Machine Works Inc., 125 Arthur St., Buffalo 7, N. Y. This system is available on new mills as well as for those already in operation.

The design of the system provides for

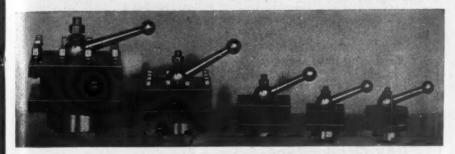


Rogers "Perfect 36" Vertical Turret Mill Equipped with Special Coolant System

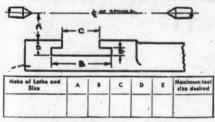
the delivery of two streams of coolant to the tool and the work through flexible tubing. After passing over the tool and work, the coolant flows back to the lowest point on the machine frame where it is drawn up, cleaned, and recirculated to the tool and the work.

The coolant is delivered by a pump which is mounted on the base of the machine and is driven by a direct-connected fractional horsepower motor. The pumping unit is self-contained, allenclosed, and self-priming. To ensure

# ENCO Turret Tool Posts Accurate • Dependable • Cost-Saving



"A" Dimension range	Model 6-S	Model 4-S	Model 31/4-S	Model 272-S	· Model H
(from diagram on this page)	2"-3-1/8"	1-9/16"-2-1/2"	1-1/8"-1-3/4"	7/8"-1-5/16"	7/8"-1-5/16 "
Lathe Swing	16" swing & up	13" to 16" swing	10" to 13" swing	Beech Lathe	Beach Lathe
	1" or 1-1/4"	3/4" or 5/8"	1/2" Sq.	3/8" Sq.	3/8" \$4.
Maximum tool bit size	1-3/8" toolholder for 3/8" bit (Where no tool bit size is specified, tur- ret will be furnished for 1 inch tool bit)	(Where no tool bit size is specified, tur- ret will be furnished for 5.8 inch tool bit)			
SPECIFICATIONS	6" square Packed in carton Shipping Weight 35 pounds	4 tool 12 position 4" square Packed in carton Shipping Weight 12 pounds Price . \$49.50	3-1/2" square Packed in carton Shipping Weight 8 pounds	2-1/2" square Packed in carton Shipping Weight 4 pounds	



One-week delivery on ENCO Turret Tool Posts made to specifications. When ordering, furnish all required dimensions and tool size desired.

- 12 position indexing
- 3 positions for each tool
- Carburized hardened steel construction
- Mounts rigidly in compound T-slot
- Keeps setting accurately
- Indexing is self-contained. Eliminates all chip interference

# IMMEDIATE DELIVERY

on Turrets for these lathes: Atlas • South Bend • Logan Sheldon • Clausina

Also all models with semi-soft base on center post for quick adaption to your lathe.

Better dealers everywhere carry complete stocks of ENCO Turret Tool Posts and ENCO Tailstock Turrets. However, if your dealer does not carry them, send your order and specifications direct to the Chicago or New York offices listed below.

# ENCO MANUFACTURING COMPANY, Dept. 2

General Office and Factory:
19321-23 MONTROSS AVE., CHICAGO 18, ILL.

Eastern Sales Office: (Complete stocks carried)
118 E. 28th ST., NEW YORK 16, N. Y

quip-

lant

lexi-

tool

the

ame re-

ump

the

Con-

all-

944

gers Mill

Rogan-Inc., This well

positive coolant flow during all machining operations, the pump starting switch is connected to the main machine switch.

The special coolant system is available on both the standard and high speed models of Rogers "Perfect 36" Vertical Turret Mill which bores, drills, and turns work up to 36 inches in diameter.

### Vard Pipe Plug Gage

Vard Inc., 2961 E. Colorado Blvd., Pasadena 8, Cal., announces a pipe plug gage which is available in three pri-

LEVELS
G&B Circular Type

attached to your Equipment.

Geier & Bluhm, Inc. River & North Sts. TROY, N. Y. mary types. The L-1 type, which is a single notch working plug gage, is used for checking the lead and minimum



Vard Pipe Plug Gage

length of threading on internally threaded pipe. The plain taper plug type is used for checking the minor diameter and truncation of internal threads. The 1-3 type is used to check the thread form for major diameter of internal threads.

The Vard Pipe Plug Gage is offered in a wide range of sizes for checking to 6-inch pipe diameters. All types and



# DOUGLAS Precision MACHINES

ed

d-

er

he m

ed to The Douglas, Miller combines rigid, well balanced design with convenience of control making it particularly suitable for accurate work in tool room as well as for general production. It is available in plain or universal type.

Showing operation with Universal Milling attachment on tool room job producing a production facture.





Showing operation with four cutters machining alloy steel for high precision aircraft parts

> Prompt Delivery to War Plants

FOR TOOL ROOM AND PRODUCTION

The Rotorex Universal Tool and Cutter Grinder will accurately perform all kinds of tool grinding operations. Readily interchangeable attachments are available to set up machine for single-purpose jobs such as cylindrical, internal and radius grinding.

Operation showing set-up for internal grinding.





Operation showing set-up for sharpening straight gash hobs.



DOUGLAS MACHINERY CO., Inc.

150 BROADWAY

NEW YORK, N. Y.

sizes are said to comply with American Gage Design standards and are made to U. S. Army and Navy specifications.

### Woodworth Comparator-Type "Limitrol" Gage

Known as the "Limitrol," a comparator type roll snap gage which is available in both hand and bench types for gaging thread diameters from No. 6 to 1 inch is now being introduced by the N. A. Woodworth Co., Sales Division, 1300 E. Nine Mile Rd., Detroit 20, Mich. Designed to eliminate the human element in inspection work, the gage can be used to check pitch diameter, lead, taper, angle, straightness, and out-of-roundness. Easy to use, it is manufac-tured with both plain and threaded rolls and is available in both open and closedend models.

The Limitrol is offered in six nominal sizes of ¼, %, ½, %, ¾, and % inch, each being adjustable % inch either way from the nominal size. Rolls are provided in three widths—%, %, and 1 inch. For gaging parts with 0.004-inch tolerances, the Limitrol is said to offer a



For inc

fac

DO

go

fin tol

cre

Woodworth Bench Type "Limitrol" Gage

250 to 1 magnification, and for parts with greater than 0.004-inch tolerances, a magnification of 150 to 1. The gage can be quickly and accurately set by simply placing a master between the rolls and turning an adjusting screw on the bottom of the gage until the indicator arm moves up under the proper limit bar. Rolls of different pitch are readily interchangeable.



For economical polishing, lapping or finishing of gears, shafts, dies, gages, ball races, long rods, etc. Built to meet the requirements of those desiring a heavily constructed, smooth running machine of highest quality.

Has one H.P. built in motor with variable speed control, using REEVES standard pulley and belt.

Smooth automatic brake acts instantly when switch is thrown.

Collets or chuck may be used.

Write today for details

# COLBORNE MFG. COMPANY

Machinery builders since 1879.

65 W. DIVISION ST., CHICAGO, ILL.

GOOD DELIVERY

April.

For general tool room grinding, Model A-3 Rotary Surface Grinder at Vinco Corporation, Detroit. Simple to operate... produces good finish...holds work to close tolerances. Production increase — 50 to 100 per cent.





WORCESTER, MASSACHUSETTS • U. S. A.

es, age by the

on diper are

18

tc.

ed en



# New! Super - Resistant! REPAIRSORRESUR **Machine Shop Floors**



A floor lasts just as long as disintegrators, such as oil, acid, water and grease can be prevented from penetrating the surface and attacking the bonding element. Imperviousness has been developed to the utmost in AWOG floors. The micrographs at right show this. Upper 'graph shows the greatly magnified surface of an ordinary concrete floor; lower graph crete floor; lower graph the surface of an AWOG

the surface of an AWOG floor. It will be noted that the pores or voids in the upper 'graph are wide open, while the lower voids at all. AWOG is recommended for new floors; for over-lays over brick, stone, or wood; for repairing or resurfacing areas of any size indoors or out.



Write for Further Information and Details

FREE TRIAL OFFER

# FLEXROCK Co.

3615 Filbert St., Philadelphia 4, Pa.

Please send me complete AWOG information details of FREE TRIAL OFFER-no obligation.

Company...

Address

### Hammond Series "RW" Magnesium Grinders

A series of 10, 12, and 14-inch grinders specially equipped for magnesium grindspecially equipped for magnessaria grant ing has been brought out by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo 54, Mich. Known as the Series "RW," the grinders are provided with explosion-proof electrical equipment and heavy plate wheel guards having direct exhaust outlets (no pockets) for connection to dust collecting system.

Additional features of the Series RW



Hammond Series "RW" Magnesium Grinder

grinders include oversize spindle for smooth vibrationless operation; large type bearings, sealed against ingress of dust and grit; multi-V-belt drive to provide for selection of various spindle speeds; and specially designed base pedestal which allows for use of any standard make of motor.

Complete equipment of the Hammond Series RW Magnesium Grinder include mounting in base for 1, 2, or 3 h.p. motor; multi-V-belt driven spindle; explosion-proof electrical equipment; hinged wheel guards of plate steel with exhaust connections and spark deflectors; adjustable work rests; tool tray, and removable water pot. Wheels and eyeshields shown on machine in accompanying illustration are extra.

nders grind-Ham-1615 Mich. nders elecwheel utlets t col-

RW

der

for

arge s of

pro-

ndle

oed-

nd-

ond ude mo-

plo-

ged .ust ad-

reyeny-

944

me-



How Good?

How Many?

How Soon?

# UNITED STATES ELECTRICAL TOOLS

5

... answer these "\$64 Questions"

N O, SIREE! The folks in our offices and plant peel off their coats, roll up their sleeves and keep the production ball rolling faster and faster. Just as you and millions of folks are doing. It's the call of America to all America... fighters, civilians, manufacturers.

Remember. we daren't slow up. we can't slacken. it's a fight to the finish!

#### SWING FRAME GRINDER



Perfect visibility; perfect balance laterally and rotatively; angular adjustment 45° to right and 80° to left; easy wheel change; ball-bearing. Chips and dirt removed in grinding silde off.

REASONABLY PROMPT DELIVERIES. WRITE FOR INFORMATION.

The UNITED STATES ELECTRICAL TOOL Co.

April, 1944

MODERN MACHINE SHOP

### "Index" 12-Inch Rotary Table

The accompanying illustration shows a 12-inch rotary table which has been added to the line of "Index" products

positive table lock; coolant trough cast in base; and hardened and ground worm gearing.



"Index" 12-Inch Rotary Table

marketed by the Blank & Buxton Machinery Co., 3100 E. Michigan Ave., Jackson, Mich. Features of the unit include ball type main bearing; quick-acting worm throwout; single motion,

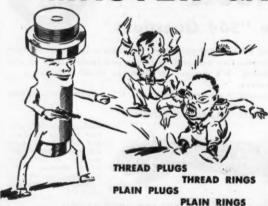
### Oakite Compound No. 86

An acid-type detergent which is designed to clean, condition, and rust-inhibit metal surfaces for the firm bonding of subsequent paint, lacquer, or other coatings, to be known as Oakite Compound No. 86, has been placed on the market by Oakite Products, Inc., 57 Thames St., New York 6, New York. The material is said to remove light

The material is said to remove light spinning compounds, drawing lubricants, machining oils, finger marks, and shop dirt from steel parts. In the same operation, the material conditions the work by imparting to surfaces a microscopic crystalline coating. This coating performs the dual function of preparing the basis metal for a firm bonding of the subsequent paint coat and for resisting rusting of parts between operations.

According to the manufacturer, Oakite Compound No. 86 is now being utilized to accelerate the production and expedite the finishing of shell cases, bombs, "blitz" cans, automotive and aviation

# **MASTER GAUGES**



THEY'LL DANCE TO OUR MUSIC . . . .

The only kind they understand.

SNAP — PROFILE
CONCENTRICITY and
BUILD-UP GAUGES
JIGS and FIXTURES

MASTER GAUGE CO.

2206 FENKELL AVE.

Phone: University 3-7676

DETROIT 21, MICH.

April,

# MILWAUKEE SURFACE PLATES

ast

rm

destndher mthe 57 rk. rht ts. qor p-qc

rk

pic arhe he ng

ite ed

e-

os.

on



accurately machined. Securely mounted cost legs are machined and provided with adjusting screws for perfect alignment. Shipping weight, 1300 lbs. Also larger or smaller plates with planed or scraped surface. We also manufacture angles and parallels as shown underneath surface plate. Write for details.

### J. C. BUSCH CO.

Engineers and Machinists Since 1907 126 E. PITTSBURGH AVE. MILWAUKEE, WIS.

# **Troyke Rotary Tables**



Sizes 9", 12", 15", 18" Ask your dealer or write us for eight page catalog.

TROYKE ALFRED A.

4422 Appleton St.

Cincinnati, Ohio

# HIGH SPEED GRINDING HIGH SPEED PRODUCTION



Every toolmaker, every tool crib, every machine shop and thousands of production jobs need a model H, K or VT Kipp Air Grinder or all three of them. Because of expanded facilities the delivery position on high ratings has been measurably improved. Accessories in reasonable quantities can usually be shipped out of stock. Madison-Kipp Air Grinders were developed by practicing tool makers so they are practical. They usually pay for themselves on a single job. Madison-Kipp Cor-

poration, Madison 4, Wisconsin, U.S.A.

★ Worker for Wright Aero-nautical Corp. here uses a model H. Kipp Air Grinder for an important burring operation on gears.

MADISON - KIPP

208 Waubesa Street

MADISON, WISCONSIN

parts, electrical and communication equipment, and many other war supplies. It is also said to have a wide range of application on peace-time products.

### Allison Collet Chuck

A collet chuck having a circular type operating mechanism which is said to ensure balance, thus making the chuck adaptable to polishing lathe and other high speed spindles, is announced by the Allison Tool & Engineering Co., 4031 Whittier Blvd., Los Angeles 23, Cal. The chuck is available in two sizes, one with ½-inch collet capacity for 1½-inch 8-thread spindles and one with 1½-inch collet capacity for 2½-inch spindles and under

The design of the chuck includes a full circular, low pressure cam which activates the collet closing mechanism and is said to provide for any desired collet pressure for gripping various materials. Movement of the cam is effected by a handle which requires very little pressure and travel for closing or opening the collet. The handle is arranged for one-hand operation at right angles to the ways of the lathe bed, thus al-

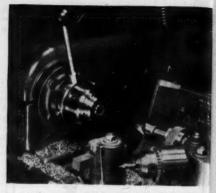


Illustration showing Allison Collet Chuck installed on lathe

lowing operator free use of other hand to insert and feed the stock or operate the bed turret.

Component parts of the Allison Collet Chuck are machined from steels and are precision hardened and ground to exacting tolerances. The chuck is claimed to be equally useful on hand-operated and automatic machines.

# OPEN END PILING BOXES NOW AVAILABLE FOR PRODUCTION USE These boxes can now be furnished to defense plants for handling of parts in production and assembly, where used as portable

THE CLEVELAND WIRE SPRING CO.

5250 Brookpark Road

Sheet Metal Division

containers.

CLEVELAND, OHIO

April,

# NASH-ZEMPEL BORING BAR INSERT

Micrometer-Adjustable



SHORT PIECES OF SCRAP TOOL BITS MAY BE USED AS REPLACEMENT CUTTERS.



and

rate

llet

and

im-

ted

This new time and money-saving boring bar insert has many advantages found in no other insert. Only one simple procedure is necessary to make a replacement cutter. Simply square up the cutter stock to fit the square hole in the insert. No special tools necessary.

The insert can be installed on any bar available by a simple boring and milling operation. The locating head of the boring bar insert fits snugly into the recessed slot of the

bar. The set screw in the boring bar locates the insert and draws the head firmly against the shoulder of the recessed slot in the bar. Accurate location point is always maintained.

Write at once for complete, descriptive bulletin.

### NASH-ZEMPEL TOOLS

Division of J. M. Nash Company

2353 NORTH SOTH STREET

MILWAUKEE 10, WIS.

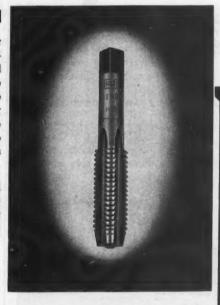
## **AVIATION PRECISION**

A prominent production engineer recently said, "We automobile manufacturers formerly thought we used close tolerances, but since we have been making aviation engines we have learned what precision really is, and," he continued, "we will use our recently acquired knowledge to advantage on the next automobiles we build."

Reiff & Nestor Company are proud to have a prominent part in the manufacture of Precision Taps doing a vital and exacting job with many War Time aviation engine builders.

### REIFF and NESTOR CO.

LYKENS, PENNA.







The Almond Three Jaw Drill Chucks were the first to be placed on the market. They were Pioneers in the field of Drill Chucks!

#### ALMOND THREE JAW DRILL CHUCKS

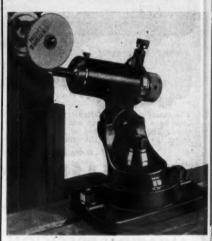
are furnished in 9 sizes with capacities from 3/16" to 1". These are made in heavy and light duty types with a taper arbor hole or with a threaded arbor hole.

Write for Complete Details



### Hybco Chamfer and Flute Grinding Heads

Chamfer and flute grinding heads for use on universal tool and cutter grinders have been added to the Hybco line by Henry P. Boggis & Co., 1279 W. 3rd St., Cleveland 13, Ohio. The chamfer grinding head is designed primarily for



Hybco Flute Grinding Head

sharpening chamfers of taps, but is said to be equally useful in sharpening chamfers of other tapered tools having evenly spaced flutes, such as core drills, step drills, countersinks, burring tools, and so on.

Eccentric relief, varied as required, is ground on chamfers. It is produced by a compound motion of the tool, which is advanced forward by cam action as it is rotated against the wheel. All lands

SEND US YOUR PRINTS FOR Quotations

THREAD GRINDING
BROACHING
MAGNETIC INSPECTION



Ap

E-Landing and the second secon

# ROTARY TABLES MADE IN FOUR SIZES. TWO TYPES OF EACH.

Table and Taper Hub in one piece. No opening in sides or under-

side of base. Sleeve thrust take-up. Worm shaft takeup. Reading in degrees and single minutes. Worm in oil bath. Also makers of Multiple Index Centers, Milling Machine Vises and Screw Machines.

JOHN B. STEVENS INC., 482 Canal St., New York 13, N. Y.

## **SAVE TIME**

ON BORING - TOOL SETTING

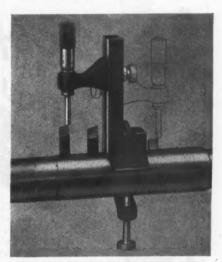
Take one trial cut, mike it, and use this gage to move the tool the exact additional amount required. Or, working from the O.D. of the bar, set the tool to exact position without a trial cut.

## USE THE BARTELT PEDESTAL MICROMETER

Time wasted in conventional cut-and-try methods can be eliminated. Inexperienced operators learn to do satisfactory work more quickly. Three models available— Model B, with two-slide pedestal, shown.

#### USEFUL FOR MANY OTHER JOBS

Bartelt Pedestal Micrometers are also excellent for height and depth gaging, for inspection work of various kinds, and for other set-up operations. Write for circular giving full information.



BARTELT ENGINEERING CO.

1216-D Partridge Avenue
BELOIT • WISCONSIN

ds for grindo line

V. 3rd

y for

said

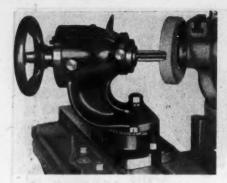
venly

and

ed, is

which as it

ands



Hybco Chamfer Grinding Head

of the tool are ground equally in each rotation by a repetition of the cam action over each land.

The flute grinding head is said to be particularly useful in maintaining proper cutting edges on straight or angular flutes of tools such as taps, countersinks, burring and other tools with equally spaced flutes. It can also be used to sharpen end teeth of end mills. In addition, its use is said to facilitate

the accurate reproduction or changing of hook to suit the job. The head can be quickly set up for grinding spiral or gun points of taps.

The Hybco Chamfer and Flute Grinding Heads make use of collets for holding tools, thus allowing for repeated grinding of tools even after forward centers have been destroyed. Both heads are designed to sharpen tools with three different numbers of flutes and are available in three sizes; namely, A for tools with shank diameters to 0.500 inch, B for tools with shank diameters to 0.800 inch, and C for tools with shank diameters from 0.500 to 1.250 inches.

#### Zagar Multiple Collet Holding Fixture

In answer to the many requests of users of standard Zagar single collet holding fixtures for a fixture with greater working capacity for use on large type milling machines, Zagar Tool, Inc., 23890 Lakeland Blvd., Cleveland 17, Ohio, has brought out the multiple collet holding fixture shown herewith. The fixture consists of four Zagar holding chucks in either the 1 or 2-inch size, and can be

cm



April



ing an

ndldted

enads

ree ail-

ols B 800

ne-

of

let

at-

ge

C.,

io,

ld-

re

in

be

11

e

Nameplate Detail Press

This machine quickly stamps details and serial numbers into name plates.

Write for Particulars

GEO. T. SCHMIDT, Inc. 1806 Belle Plaine Ave., Chicago 13, III.



Standardized Die Sets, embodying many exclusive features, a listing of more than 195,000 stock sizes and 46 different styles afford a service that is unsurpassed.

Send for Our New Catalog

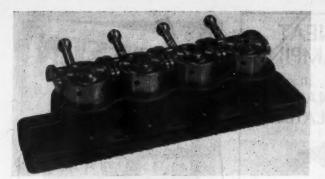
E. A. BAUMBACH MFG. CO.

1806 S. Kilbourne Ave.

Chicago, III.



City..... State.....



Zagar Multiple Collet Holding Fixture

climb cutting, two fixtures can be mounted on each end of the table, making a total of 16 collets in one setup.

The Zagar Multiple Collet Holding Fixture is simply designed to allow for easy use by inexperienced work-men and is ruggedly constructed to provide for long service. Chip

pegri

ton

Sta

190

troubles are said to be eliminated through arrangements whereby coolant can be forced upward through the fixture, thus washing chips away.

mounted either parallel with or at right angles to the milling machine spindle. Two, three, or four collets can be used, or multiples thereof.

Any number of multiple fixtures can be used at one time, depending upon the length of the milling machine table. Center-to-center distance of collets is 3½ inches on the 1-inch fixture and 5½ inches on the 2-inch fixture. Two fixtures can be staggered, however, reducing the distances to 1¾ and 2¾ inches respectively. Where the miller is equipped for

### Ross Model No. 835 Midget Air Control Valve

An unusually compact midget air control valve which can be operated at sustained speeds up to as high as 400 re-

# RENEWED or NEW SURFACE PLATES



Swanson Seasoned Surface Plates are made in 24 standard sizes to 36"x 60" —special sizes to order. Wood covers and handles included with each plate. e SWANSON Seasoned Surface Plates are available in 24 standard sizes and special sizes to order. However, we can make your old Surface Plate like new again, or if it is too worn to be reconditioned, we'll make a good allowance for it towards a new Swanson Plate. Just write us before you send your old plates. Our principal business is precision machining and toolmaking, so we know the value of an accurate Surface Plate. Write for instructions and price list.

TOOL AND MACHINE PRODUCTS, ERIE, PA.

302

April, 1

## IMPROVED BALANCING WAYS

t

7 0

ıt-

he

al

ne

ole

re

to

by k-

ly

de

ip

be

us

n-

se-

an

00

-

on

an

at.

4



rout chilled tron discs rotate on special sensitive pearings. For balancing, straightening and trueing. Write for details.

owing	20"	40"	60"	72"	96"
Greatest Dis- tance Between Standards	20"	30"	30"	66"	88"
Capacity	1.000	2.000	2.000	5.000	10,000

ANDERSON BROS. MFG. CO.

1926 Kishwaukee St.

Rockford, III.

### HERE'S THE BARGAIN IN METAL SHAPERS

This Lewis 10" Metal Shaper is supplied as rough or semi-finished castings at a cost that is unbelievably low, yet it can be quickly completed ready for operation. All necessary materials and detailed construction blueprints are furnished with the castings, and the semi-finished Shaper requires only lathe, drill press and hand finishing. You can handle a wide range of shaping jobs on this versatile machine tool, cut shaping costs on those smaller



jobs, relieve big machines for other needs. Write for Lewis Catalog describing 22 other useful tools — and ask for quotations.

P. O. Box 116,

Station A, Dept. T-38, Los Angeles 31, California



THIS, WITH TEN ACCURATE INDEXED TOOL, POSITIONS ALLOWED MINUTE ADJUSTMENTS

MADE UP IN FOUR INDIVIDUAL SIZES

to 30" SWING



Time saved brings VICTORY that much nearer. Our NEW IMPROVED TURRET HEADS are built to take heavy cuts, and give precision savrice. Inexperienced help can quickly become fast operators with these NEW IMPROVED TURRET HEADS,

Write Today for Complete Details

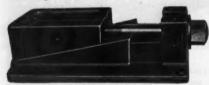
132 CHARLES STREET

AUBURNDALE, MASS.

## Accuracy Begins at the Base with **Leveling Jacks**



Scientifically designed leveling jacks for any equipment which demands extreme accuracy.



Standard Size No. 100A (base 6" x 9", average height 2%", top section 4" x 4%") will fit most requirements.

Extra large base and screw assures permanent accuracy. Angular faces are finished.

SPECIAL SIZES SUPPLIED ON REQUEST.

IMMEDIATE DELIVERY

JURZEK MACHINE & ENGINEERING CO. 2303 HILTON RD. FERNDALE, MICH.

versals per minute is now being manufactured by the Ross Operating Valve Co., 6484 Epworth Blvd., Detroit 10, Mich. Designated as the Model No. 835, the valve is a 4-inch heavy duty, sole-noid-operated, four-way unit for the

Do

No. in st DO 35

Go

eq tu

ab ev

sei

g.I

ma

dis

April,



Ross Model No. 835 Midget Air Control Valve for Control of Double-Acting Cylinders

control of double-acting cylinders. It may also be used as a three-way valve by plugging one outlet.

The Ross Model No. 835 Midget Air Control Valve is 7 inches long x 3½ inches wide x 5½ inches high overall. Noteworthy features claimed for the valve include low current consumption, noiseless operation, and long life.

### ARTUS ARBOR SPACERS The COLOR tells the THICKNESS



**ARTUS Arbor Spacers made** of plastic in various colors identity thickness at a glance! .001, .0015, .002, .003, .005, .0075 .010-.030. Speed up accurate fitting at low cost. Write for folder. Spacers, Gaskets, Shims IMMEDIATE DELIVERY

INDUSTRIAL PRODUCTS SUPPLIERS New York, N. Y.



anualve

sole-

ilve

alve

Air 31/2

rall.

the

ion,

5

de

ors

a 22, 30. at er.

Y.

944

10,

DORMAN MACHINE TOOL WORKS

to 3/4" in steel or other material.
No. 3 Positive Tapper Drives from 1/2" to 1" in steel or other material. Write for Details.

### D&W MAGNETIC CHUCKS



Standardize on D & W Chucks. It is designed to give maximum holding surface with strong and uniform pull. Special demagnetizing switch supplied with each chuck, for readily releasing work.

Send for folder covering chucks and demagnetizers

J& H ELECTRIC CO. 202 Richmond St. Providence, R. I.



No. 2 Positive Tapper Drives from 1/4"

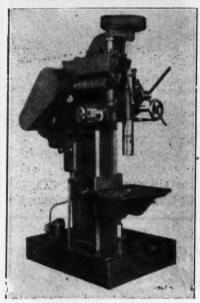
Good pumps PAY. Buy the kind used as standard equipment by many leading machine tool manufacturers—BRADY-PENROD. Model 7500, shown above, is one of a complete line designed to meet every need. It handles all coolant liquids—kerosene, solubles, light and medium oils, etc., 4 to 100 g.p.m. Tank sizes, 6, 15, 30 gal. or larger, with as many hoses and nozzles as required. Discharge pipe is cast integral with pump and brought to outside of tank. The hinged cover allows cleaning without disconnecting return line.



Incorporated
525 E. Eighteenth St., Muncle, Indiana, U. S. A.
1945 Santa Fe Ave., Los Angeles, Calif.



## ANOTHER BAKER-BUILT MACHINE



MODEL No. 314-A (Universal Quick Change Type)

Ample capacity to drive 3-inch diameter high speed twist drills to limit of their efficiency in steel. Also adapted to boring, counterboring, facing, forming and tapping operations.

## BAKER BROTHERS, INC.

### Grob Self-Seating Saw Guides

Especially designed to allow for the use of unusually heavy pressures in cutting metals without destroying saw blades from the rear, a line of self-seating saw guides for band sawing ma-



Close-up view of Grob Self-Seating Saw Guides installed on band sawing machine together with lubricator attachment

chines is now being manufactured by Grob Brothers, Grafton, Wisconsin.

The guides are made of a special hard bronze aluminum alloy which, according to the manufacturer, although it pos-

### Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive—Last for years. Write for Circular.

NIELSEN TOOL & DIE COMPANY 1960 W. Eleven Mile Rd. Berkley, Mich. Med

nee

can

time

chin

both cut-

med

mos

the

Sav

or the res in g saw selfg ma-

uides

hard ding pos-

ith noles,

and

ated. inate

hods. nsive Write

1944

des



TYPE HOLDERS AND TYPE ROLL MARKERS.
HAND STAMPS LOGOTYPES DIES STANDARD
AND SPECIAL STAMPS INSPECTORS STAMPS
MACHINE ENGRAVING PRECISION DUPLICATING.

NEW METHOD STEEL STAMPS, Inc.

### **Automatic Metal Saw Grinder and Retoother**

MODEL IC



PRECISION
and
ACCURACY
AUTOMATICALLY
ASSURED

For metal cutting saws 2" to 14" in dia. When specified, saws as small as %" dia. and %" to 2" spacing. Also supplied as a Combination Grinder for circular, band and hack saws.

WRITE FOR CIRCULAR

The Wardwell Mfg. Co.
3166 Fulton Rd. Cleveland, Ohio



April, 1944

MODERN MACHINE SHOP

sesses tough wearing qualities, allows the saw band to seat itself and will not harm or score the saw blade in any way, thereby providing for long blade life. Long life of the guides is said to be assured by means of a felt oiler mounted directly above the upper guide.

The Grob Self-Seating Saw Guides can be adjusted so as to support the saw band immediately above and below the work—a feature which is especially important when using narrow blades. The design of the guides is such as to provide for maximum vision during sawing of work, and to allow for quick and easy changing of saw blades.



## M-D Facing Heads

Can be attached to Boring Mill Ber, and Oritling er Milling Machine spindles. Single point tool travels radially, from center outward er reverse, feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

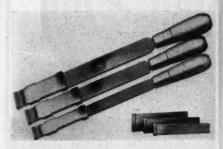
### MUMMERT-DIXON CO.

130 PHILADELPHIA ST.

HANOVER, PA.

### Anderson Carboloy-Tipped Scraper Blades

A Carboloy-tipped scraper blade which is available in three widths to fit Anderson standard hand scrapers is now be-



Carboloy-Tipped Blades for Anderson Hand Scrapers

ing offered by Anderson Bros. Mfg. Co., 1926 Kishwaukee St., Rockford, Ill. According to the manufacturer, the Carboloy-tipped blade can be readily substituted for the high speed steel blade in Anderson hand scraper now in use by



WHY?

MANUFACTURED

J. MILTON LUERS

12 PINE ST.

MT. CLEMENS, MICH.

Produced under License Issued by John Milton Luers Patents Inc.

April

collet chucks

hich derbe-

Co.,

Ac-

rbo-

sti-

by

All grip—no slip... no bearings, friction, heat or lost power... push out type... full spindle capacity or over... automatic adjustment... work re-set without stopping lathe... 2 sizes, 1" and 2" capacities... order now with proper priorities.

immediate deliveries.

HALL MANUFACTURING COMPANY Ph. NO 9679

622 Tularosa Dr. Los Angeles 26, Cal.





simply removing the high speed steel blade and slipping in the Carboloy-tipped one, thus providing for greatly increased blade life.

### Davey Portable Balancing Equipment

Intended for the purpose of locating the positions and magnitudes of weights required to correct unbalance in steam turbines, electric motors, hydro

generators, fans, blowers, motor generators, gears, couplings, and machine parts of any size and speed, the Davey Portable Balancing Equipment illustrated herewith is now being marketed by The Vibroscope Co., 6 E. 39th St., New York 16, N. Y. Parts may be balanced either assembled in their own bearings or in special bearings consisting of pedestals of the simplest type with beit drive or

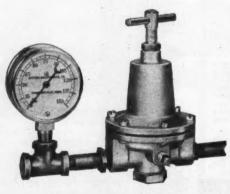


direct drive through a coupling.

The Davey Portable Balancing Equipment consists of a vibrometer which measures vibration amplitude directly, a stroboscope which gives a direct visual reading of "high spot" or phase angle, and a remote control switch which is mounted on the vibrometer and provides for one-man operation of the entire equipment. The equipment is of

## Air Regulating Valve

new...inexpensive



These new combination regulators and valves are equipped with a special compound spring, which provides sensitive and instantaneous adjustment for all secondary pressures from 1 to 150 lbs. Send for bulletin No. 83-B—Dayton Rogers Manufacturing Co., 2849 12th Avenue South, Minneapolis 7, Minnesota.



WRITE FOR STOCK LIST





2326 S. CANAL ST.

uiphich

ctly,

hase

pro-

en-

MEAD

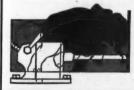
Preumatic

CHICAGO 16

## "FLAT TOP" WORK HOLDER

This new type of air-operated fixture for holding small flatwork for toolroom use or production operations solves a troublesome problem. Mead "Flat Top" holds any work which is





flat on the bottom, regardless of peripheral contour. Assures "dead true" perpendicularity for drilling, reaming, tapping operations. Completely described in the new Mead Air Power Catalog...just out.

### MEAD SPECIALTIES COMPANY

15 S. Market Street Dept. 44-AA Chicago 6, U. S. A.

1944

# GWILLIAM JOURNAL ROLLER BEARINGS



Type JR

STANDARD SIZES SHOWN IN OUR GENERAL CATALOG

Copy Sent Upon Request

### THE GWILLIAM CO.

358 FURMAN ST. BROOKLYN, N. Y.

Just off the Press



#### MAIL COUPON TODAY

The Van Keuren Co., 177 Waltham Street, Watertown 72, Mass.

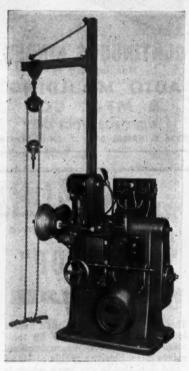
Kindly send me a copy of your NEW Catalog and Handbook No. 32. It is understood that this request incurs no obligation on my part.

NAME	
POSITION	•
COMPANY	*
ADDDECC.	

simple design and, according to the manufacturer, a theoretical knowledge is not required to interpret balancing results. It is available in two models weighing 22 and 25½ ib. respectively, complete in portable case with batteries.

### Lempco Special Aircraft Brake Drum Truing Machine

Designed to meet the specific needs of military aircraft maintenance, the Lempco Special Aircraft Brake Drum



Lempco Special Aircraft Brake Drum Truing Machine

Truing Machine shown in the accompanying illustration is now being introduced by Lempco Products, Inc., 5717 Dunham Rd., Bedford, Ohio.

Features of the machine include a

Features of the machine include a squirrel cage induction type motor (no brushes) to eliminate the danger of

Apr

Gr

jus

**ADJUSTANGLE** KNURL HOLDER

the dge

ing

lels

ely,

ies.

of the

um



ADJUSTS TO MAKE MANY PAT-TERNS from STRAIGHT KNURLS







Using the same pair of straight knurls, the Graham Holder makes many patterns by adjusting the angle. Shank specially made to fit your turret. Capacity up to 21/2" work dia.

Request new Illustrated price circulars

GRAHAM MFG. CO.

32 BRIDGE ST. EAST GREENWICH, R. I. GOOD DELIVERY ON BOXES SHOP

Taper Pans

Shop Boxes

Stacking Boxes

Stack Units

Spare Parts Boxes

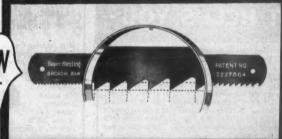


A-S-E Stack-Units Open Front Type

Special Steel Fabrication in Gauges from 10 to 24.

All-Steel-Equip Co., Inc. 1020 Kensington Ave. Aurora, III.

means faster metal cutting



Ita a Super-Sterling Saw

The teeth tell the secret of this faster. cleaner cutting hacksaw. Each tooth ting action. You'll feel the difference. Order through your Mill Supply Dealer.

is larger, providing a generating cut-

DIAMOND SAW WORKS, Inc. BUFFALO, NEW YORK

10 of

sparks; magnetic starter switches; special cones to fit aircraft drums; silencers, and so on. Change from turning to grinding operation, or vice versa, can be readily made by simply rotating turret containing both truing tool and grinding wheel. The crane and hoist shown with the machine are optional equipment.

### LeMaire "Match-It" Gear Chuck

A gear chuck featuring a unique method of gripping that is said to provide for maximum accuracy in boring or grinding holes in gears, to be known as the "Match-It," has been placed on the market by the LeMaire Tool & Mfg. Co., 2659 S. Telegraph Rd., Dearborn, Mich.

Designed to accommodate both helical and spur-toothed gears—either external or internal—the chuck consists of two plates, each having a set of grippers ground to close limits and accurately positioned. One gripper plate is stationary while the other can be rotated by means of a handle.

To grip a gear, the gear is simply located on the center of the chuck and the movable plate rotated by handle, thus causing the grippers of both plates



LeMaire "Match-It" Gear Chuck

to be firmly clamped on each side of gear teeth. Since the pressure is always through the cross section of teeth, the possibility of distorting gears is claimed to be greatly reduced.

The LeMaire Match-It Gear Chuck can be used in finish boring, facing, and counterboring gears. It can also be used in grinding and finish shaping one set of teeth from another as in the case of countershaft or cluster gears.

### IT HELPS YOU --

Eliminate many costly hours from your payroll, because the JACKSON TIME-SAVING VISE prevents the customary loss of time by highly-paid Machinists while hunting for Bolts, Washers, Clamps, Angle Plates, etc., for rigging up jobs on the Drill Press, Miller, etc. Of even greater value to you is the fact that for every hour so saved you gain an hour's output by getting your idle machine back into production that much sooner. These gains are effected by the—

### JACKSON TIME-SAVING VISE

by means of its revolving Turret Jaw and Supplementary Jaws which promptly hold the thousand and one shapes that arise in machine work. Send for Bulletin No. 23-M.



BROWN
ENGINEERING CO 120 N IMIRD SI

### STEEGE MOTOR DRIVES FOR DEFENSE GUARANTEED FOR FIVE YEARS

No chance of breakdown, doing a good job powering machines for defense production. No noise, floating cone, results 100% power. 8 years of production proof of durability. Easily installed.

PRICED AT \$40 AND UP.

FOR LATHES, SHAPERS, MILLERS, ETC.
IMMEDIATE

Send for descriptive pamphlet.

DELIVERY.

W. L. STEEGE MACHINERY CO. 102 JEFFERSON ST. CHICAGO, ILL.

April,

## HAMILTON SWISS TYPE GEAR HOBBERS



Manufactured by THE HAMILTON TOOL CO.

Hamilton, Ohio

of

the ned

and

be

one

ase

...for accuracy and speed in hobbing PINIONS, GEARS and SECTORS.

TWO

No. 00 SPUR GEAR HOBBER for work up to 2" dia. No. 1 SPUR and SPIRAL GEAR HOB B E R (Illustrated) for work up to 6"

Write for further details to

TRIPLEX MACHINE TOOL CORP. Exclusive Sales Agents 125 Barclay St., New York 7, N. Y.



**DUPLICATING** and PROFILING

### **AUTO - ENGRAVER**

Accurate Engraving with Unskilled Operators

Unskilled operators will profile or accurately reproduce in smooth lines any design, number, letter, emblem; on iron, brass, copper, aluminum, soft steels and all plastics. Here are some of its other uses . . Drills a series of holes, or profiles small parts. • Cuts an even channel for wiring on panels. • Increases accuracy and production. • Works from original drawing or templates. • Etches glass and similar items. • Will not cause distortion. For information and prices write Dept. M.

### **AUTO-ENGRAVER COMPANY**

1776 Broadway, New York, N. Y.

## **SCREWDRIVERS**

Built for Speed and Durability

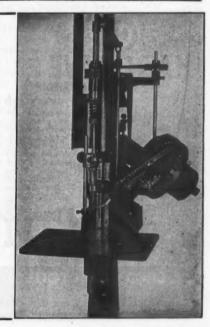
THREE MODELS

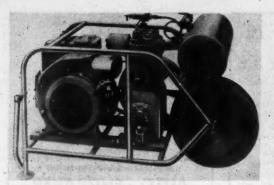
MACHINES WILL DRIVE WOOD, MACHINE AND SELF-TAPPING SCREWS at ONE SECOND EACH

Send samples for production estimates

DETROIT POWER SCREWDRIVER CO.

2807 W. Fort St. DETROIT 16, MICH.





### Quincy Wheelbarrow Type Air Compressor Unit

The illustration herewith shows a compact, wheelbarrow type air compressor unit which is now being manufactured by the Quincy Compressor Co., Quincy, Ill. Weighing only 225 lb., the unit is said to be easily wheeled by one man. Despite its small size, the unit incorporates a powerful single-stage air-cooled Model 216 Quincy compressor with an air delivery in excess of 16 cubic feet

per minute at 80 lb. pressure. The compressor operates at a speed of 1,250 revolutions per minute.

Especially constructed for outdoor use, the Quincy Wheelbarrow Type Air Compressor Unit includes a steel front wheel that is said to be mud and water-proof, and an ingenious belt tension adjusting device for easy starting of the gasoline motor in extremely cold weather, By means of a hand crank the compressor load is

removed from the motor during starting, after which the belt is again tightened for operation.

For sturdiness and lightness, the allmetal frame of the unit is constructed of welded tubular steel. The handles are hinged so as to drop out of the way when the unit is stationary or being transported.

The Quincy Wheelbarrow Type Air Compressor Unit can be used in exterior and interior paint spraying, camouflage





April,







Air

at a per for heel-essor wheel and nious

oline cold

d is

ting,

ened

all-

are

eing

Air

rior

lage

### Adjustable Limit SNAP GAGES

MODEL B



MODEL C W. E. JOHNSON CO. Keep down your gage costs by using these fast, accurate gages. Reset when necessary. Also: Flat and Cylindrical Plug Gages, Built-Up and Solid Snap Gages, Flush Pin and many other types of gages.

FOR DETAILS.

Factory: Turnpike and Pequannock Avenue Pequannock, N. J.



### A BLADE TO MATCH YOUR JOB IN AN EASIER-TO-HANDL FRAME

Here is a practical metal-sawing combination with two VICTORS—a blade and a frame—each helping you to achieve the best results.

A chart packed with each frame and blade unit gives easy-to-follow tables for proper blade selection with hints on proper blade use. It will help new, unskilled employees to do faster, better metal sawing.

## VICTOR BLADES FOR POWER SAWING, TOO

are described and illustrated – along with all VICTOR products including band saws – in "Metal Cutting", a fact-packed, helpful booklet which will be sent you on request.

### VICTOR SAW WORKS, INC.

Middletown, New York



Makers of Hand and Power Hack Saw Blades, Frames, and Band Saws.

work, emergency servicing of motorized units or airplanes, and numerous construction operations.

### **Empire Floating Toolholder**

Designed to provide for correction of misalignment—both off-center and out-of-parallel—the floating toolholder shown



**Empire Floating Toolholder** 

herewith is now being offered by the Empire Tool Co., 8774 Grinnell Ave., Detroit 13, Mich. Consisting of only five component parts with the moving parts

riding on rollers so placed as to effect an exacting self-adjustment of the float in any direction, the toolholder, according to the manufacturer, can be used to ream holes with close tolerances to absolute size and perfect roundness. The rollers also tend to make the members anti-friction and to provide for smooth operation.

The Empire Floating Toolholder is available in two body sizes. The 2½-inch body can be obtained with ½, ¾, or 1-inch hole and with choice of 1, 1¼, or 1½-inch diameter shank. The 3-inch body is made in 1, 1¼, and 1½-inch holes with choice of 1¼, 1½, 1¾, 2, and

21/4-inch diameter shanks.

### Forss Aircraft Riveting Hammer

A slow-hitting aircraft riveting hammer which is especially designed for easy handling by women operators is now being introduced by the Forss Pneumatic Tool Co., 1827 Broadway, Rockford, Ill. Features of the hammer include two-finger control, metered air throttle valve, improved offset handle, lightweight construction, and compact, well-balanced design.



radiustate to it various size latines, clustings are formished with each boring bar.] Everede Holders keep the boring bar in a horizontal position, regardless of any change in the size of the lathe, within limits. • The No. 1 Holder for lathes from 8" swing to 12", and the No. 3 Holder on engine lathes from 12" swing to 24".

### EVEREDE TOOL CO.

180 N. Wacker Drive Chicago 6, III.



Danly
Special Sets

Production

DANLY MACHINE SPECIALTIES, INC.
2100 S. 52nd Avenue, Chicope, III.
MILWAUKEE • LONG ISLAND CITY, N. Y.
DAYTON • DETROIT • ROCHESTER
CLEVELAND • PHILADELPHIA
Ducommun Metals & Supply Co.
Los Angolos • San Francisco

DANLY PRECISION .E.T.

MILLING DRILLING BORING Heavy Duty TTACHMENT ... Operations



ffect float ord-

used s to

The

bers

ooth

3/4, 11/4,

inch

inch and

er

am-

for

neuoek-

inair

ndle.

act,

er

DIE DTS. 1944

r is 21/2EASY MOUNTING LARGE QUILL-4" TRAVEL

(counter balanced, ardened, and ground) 6 SPEEDS, 250-3000 RPM.

Ver and Worm Foods Vs H.P. Motor

Specially engineered by RUSNOK to meet the demand for heavier duty end mill operations. Uses mill operations. Uses a many types of cutters on a wide range of wark. Large size spindle (No. 9 & & Staper). Takes 1½ to 3/4 and mills. Precision Engineered and Ruggedly Constructed .Throughout.

Write for descriptive folder.

RUSNOK TOOL WORKS 1840 North Avenue,

Chicago, III.



Save Time on WAR ORDERS BEVERLY Throatless SHEAR

If you're cutting straights or irregulars on "War" jobs, you can speed 'em up with a BEVERLY. Write for sizes and prices now!

BEVERLY SHEAR COMPANY

3004 W. 111th St.

Chicago, III.



BUCKING -NO BREAKING

Saves Blades . . . Increases Production . . .

10 Days Free Trial

Cutting speed is gained by pushing against the saw blade. PADDOCK BALL-BEARING BAND SAW GUIDES enable workers to crewed work through . . practically double effi-ciency of any band saw. Every point of support is a ball-bearing wheel running in same direction with saw. PAD-DOCKS are recommended for use in cutting all kinds of material. Remember—guide wheels are inter-changeable (you can balance wear by switching wheels). Write for full details and prices.

PADDOCK TOOL COMPANY

**Guide Makers Since 1920** 1418 Walnut St.

**BAND SAW GUIDES** 

**Guided and Guarded by 6 Safety Points** 



April, 1944

MODERN MACHINE SHOP

The valve mechanism and porting are arranged so that the piston is driven with maximum efficiency, thus reducing jarring and vibration to a minimum and providing for unusually powerful operation. The long, comfortable, twofinger trigger bar with its metering throttle valve is said to provide an exceptionally easy and accurate means for controlling the speed and number of strokes of the tool.

The Forss Aircraft Riveting Hammer is available in two sizes with offset or conventional grip handles. The smaller size, designated as the HA-19, has a

### SHELDON

SHELDON offers a complete line of Arbor SHELDON offers a complete line of Arbor Presses—10 sizes; capacities from 3 to 10 tons; Bench and Floor types with Simple, Compound or Pilot Wheel operating Levers. They are quality tools improved in design and accurately machined, are stronger, handler and more versatile. They have round rams which simplify lig design and can be held in accurate alignment where desirable with SHELDON patented R am Aligner. Gears are

Aligner. Gears are non-stripping alley steel.

Write for Catalog shoot.

SHELDON MACHINE CO. INC. 4250 N. Knox Ave. Chicago, U. S. A.



Forss HA-19 Aircraft Riveting Hammers

nominal capacity for 1/8 to 1/2-inch rivets, and the larger size, designated as the HA-39, has a nominal capacity for 4-inch rivets. The HA-19 with offset handle is 5% inches long overall, including beehive retainer, and has a weight of 2 lb. 5 oz. With the grip handle, it is 7% inches long and weighs 2 lb. 7 oz. The HA-39 with offset handle is 8 inches long and weighs 2 lb. 14 oz. With grip handle, it is 10% inches long and weighs 3 lb. Both size hammers are supplied complete with beehive retainers and adjustable air regulators, and are equip-ped with nozzles which are designed to take standard Parker taper shank rivet sets 1% inches long x 0.401 inch diameter.

### Speed & Quality

PEERLESS Abrasive Belt Surfacing Machines are not excelled for fast grinding and sanding of flat surfaces of metal, wood, rubber, plastics, etc. They can be furnished in 9", 14" and 20" sizes.

Other Horizontal and Vertical types for flat or round work can be furnished.

PRODUCTION MACHINE CO., Greenfield, Mass.



April

Why Use A Shaper to cut Keyways when a

DAVIS
KEYSEATER
will do the
job so much
quicker
and
better?

for

Circular

rivas for fset

udght , it

oz. hes

ghs lied

ad-

uip-

l to

am-

944



Exchange and Glasgow Sts. ROCHESTER, N. Y.

The CRITERION
Carbide Tool
Grinder

GREATER PRODUCTION CAPACITY

Provides positive rapid adjustment to meet the ngid requirements of production tool manufacturing. Built for continuous service. Adjustable coolant system. Large work tables instantly adjustable without wrenches or other tools. One-trut H.P. balanced precision bearing motor com-

plessly enclosed and radially mounted in rubber. Standard equipment: One 60 and one 100 grit 7" dux steel backed sibcon carbide wheels. Ideal for metal bonded or Resinoid bonded diagnost wheels.

Order from your dealer or write direct. Request literature.

CRITERION

MACHINE WORKS
BEVERLY HILLS CALIFORNIA

## SAVES TIME — SAVES MANPOWER and INCREASES Production!

That's what the PRECISION WIRE STRIPPER is doing today for hundreds of war production plants throughout the U. S.—AND IT WILL DO THE SAME THING FOR YOU if wire stripping problems now confront you.

In a twinkling, this ruggedly built precision instrument removes insulation from the ends of solid, stranded or multi-conductor cable and wire up to a half inch in diameter AND IT DOESN'T REQUIRE A SKILLED OPERATOR.



Orop us a line now and we'll send you complete details on THE PERFECTION WIRE STRIPPER by return mail.

## WEBER MACHINE CORPORATION

59 Rutter St.

Rochester 6, New York

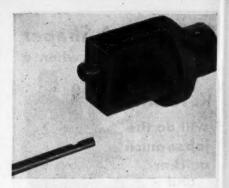
#### American Round Pin Type Broach Pull Head

The American Round Pin Type Broach Pull Head illustrated herewith, product of the American Broach & Machine Co., Ann Arbor, Mich., is designed for use in connection with small pull broaches having shanks ½ inch in diameter and smaller with half-round grooves across

the pulling ends.

When inserted into the head, the broach is pushed to a point where a pin automatically slips into the notch in the broach shank. Sufficient mechanical pressure is provided back of the pin to seat it positively in the notch in the shank. This type of construction is not only said to provide for a positive pulling arrangement but also for positive radial positioning of the broach—a desirable feature, especially where small broaches must be positioned in relation to the work. The broach can be released for removal at any time by pushing the cross pin with thumb and forefinger.

Where automatic releasing of the broach is desired, a screw is threaded into a plunger just above the bore which receives the broach and is adjusted so as to come in contact with the reducing bushing. Thus, upon the return



American Round Pin Type Broach Pull Head

lev

tur

squ

co-

an

stroke of the broaching machine, the pressure on the screw causes the plunger to recede, thereby releasing the cross pulling pln, at which time the broach can be removed without touching the pull head. This automatic releasing feature is said to be desirable where production is necessary and where the operator needs the use of both hands during operations where the broach must be removed at the completion of each stroke.



Apri

## "ALL-WAY" LEVFI



The FELL Precision Level is made to show the level of all ways at once. This eliminates disturbing the first level when leveling the second. Graduations are in .0005" per foot and form squares about a circular bubble, thus giving co-ordinate readings and showing direction and amount of slope, if any.

MADE IN TWO SIZES

51/2" x 12"

31/2" z

31/2" × 6" Write for Bulletin

702 SOUTH ST.

d

he

n-

88

an

ıllı

re

on or p-

e-

e.

ROCKFORD, ILL.



1845 South Kilbourn Avenue - Chicago 23, Illinois

"Let Us ... Recondition Your Tap Extractors" 48 Hour Service

Send us your damaged tap extractors. All broken holders, collars and sleeves will be replaced without charge.

Steel fingers replaced at standard list prices. Put your Waltons in condition now. Idle tools cost you money.

Walton TAP EXTRACTORS Back Out Broken Taps

No annealing

No drilling

No damaged threads

No costly delays

Immediate Shipment, Stock sizes No. 4 to 11/2", 2, 3, 4 flutes. 30 day free trial.

Write for folder No. 10.

The WALTON Company 94 ALLYN STREET · HARTFORD, CONN.



### ACE HIGH . . . a winning hand

These little brass condenser-plates for aircraft radios will help bring many a flyer back from his mission. Ace turns them out by the hundreds of thousands. There must be no burring and the similar contours of both pieces must be identical.

RELY ON ACE FOR PRECISION GRINDING Centerless, Internal Cylindrical, External Cylindrical, Blanchard Surface, Plain Surface, and Thread Grinding.

PRODUCTION MACHINING Turning, milling, drilling, cutting, tapping, and threading of small machine parts that require precision grinding—on a mass-production basis.

METAL STAMPING Blanking, forming, and extruding of small metal parts on presses up to 75-ton capacity. Spot welding, sub-assemblies and assembly of intricate radio and machine parts.

HEAT TREATING Electric and gas furnaces, individually pyrometer controlled, for high-heat, quenching, and carburizing of parts up to approximately 10° x 10° x 15°.

TOOL AND DIE WORK All operations for the production of Punches and Dies for small stampings, for Jigs, Fixtures, Gages, Moulds, Form Blocks. Tool Bits and Circular Form Cutters.

Send Blue Print, Sketch, or Sample to



## ACE MANUFACTURING CORPORATION for Precision Parts



1235 E. ERIE AVENUE, PHILADELPHIA 24, PA.

### Sheffield Adjustable Dial Indicator Snap Gage

An adjustable dial indicator snap gage now being made by The Sheffield Corp., Dayton 1, Ohio, is available in 12 standard models covering a range of 12 inches, with larger sizes supplied to specifications. An important application of the gage; is checking work as it is being brought down to size. Being readily portable, the gage permits an operator to make a comparator type of check without removing work from the machine. It can also be used for inspect-

Th

vic

or

far

no

vit

TI

April,



Illustration showing Sheffield Adjustable Dial Indicator Snap Gage being used in normal position to check work in machine

ing finished parts at the bench and for classifying parts.

The Sheffield Adjustable Dial Indicator Snap Gage includes a 2½-inch diameter shockproof dial indicator which is graduated in 0.0001 inch. The indicator is of the balanced type, plus and minus 0.005 inch, and range per revolution of the hand is 0.010 inch. When properly set, the hand will make 1½-inch revolution in either direction, the total range of the indicator being 0.025 inch.

The anvils are ground and lapped to gagemaker's tolerances. The movable anvil is spring-urged and operates independently of the indicator spindle with a constant pressure, further assuring the accuracy of the gage. The bearing is sufficiently long to assure continuous alignment.

When the gage is used in normal posi-

### Gear Specialties

tor

age

rp.,

nd-12

to

ion

is adra-

eck

ma-

ect-

for

tor

ter

id-

of 005

he

et,

on

of

to ole

le-

th ng ng us

si-44

SPURS - HELICALS (14 to 96 D.P.)

BEVELS — (straight and spiral)

#### WORM GEARING — THREAD GRINDING

This range logically embraces the gear components of many critical control devices essential to the war effort and this organization is proud of its contributions of such material in the program.

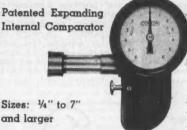
With full production capacity scheduled far into the future, all new inquiries are now necessarily subordinated to these vitally important prior commitments. However, every urgent need will be given careful consideration.

Gear Specialties

2-point gaging of precision bores to fractions of .0001"

### COMTORPLUG

Patented Expanding Internal Comparator



Comtorplug puts into the hands of your operators, inspectors, trainees a practical means of gaging holes to fractions of .0001". Accurately indicates size, out-of-round, front or back tapers, etc. Completely dependable, even in comparatively inexperienced hands.

REQUEST BULLETIN 29

64 Rumford Ave.

Waltham, Mass.

EXTRA STRENGTH Can Save Time and Labor

When three screws can do the work of four, five or more, they save drilling, tapping and assembling time and labor. They speed production and cut costs.

Mac-it Hexagon Head Cap Screws are heattreated for maximum strength and toughness. This extra strength can be used to provide ample holding power with fewer screws.

The Mac-it "m" on the hex head is your guarantee of quality. It appears on all diameters 1/4" to 3/4", inclusive.

OTHER MAC-IT PRODUCTS INCLUDE:

Hexagon Socket Cap Screws, Hollow Set Screws Hollow Pipe Plugs, Stripper Bolts Square Head Set Screws

STRONG, CARLISLE & HAMMOND CO., Cleveland, O.





tion, the indicator is at the lower end of the gage frame. This permits the weight to be carried on the stationary anvil instead of the gaging anvil, thus resulting in a check of maximum accuracy. Where it is impossible to use the gage in a normal position because of interference, it can be reversed with the indicator on top without impairing the accuracy of the reading. In such instances, the operator adjusts the position of the indicator radially to meet his requirements and then exerts a slight upward pressure on the gage so as to locate from the stationary anvil, thereby

leaving the movable anvil free from weight. The adjustable anvil has a maximum

range of 1 inch, thus enabling the gage to be used on a number of different size work parts. The backstop is formed with a cylindrical radius so as to permit the gage to be presented to the work at angles other than 90 deg. to the axis of the part without impairing the accuracy of the reading. The backstop is adjustable to a varied degree on each size gage.

The gage frame is light in weight yet, because of a special design, is adequately rigid and free from stresses. The handhold has been formed at the proper point in the frame to assure a comfortable grip and reduce fatigue to a minimum. Serrated plastic grips on each side of the frame of the gage also facilitate its use and insulate the gage against the effect of temperature of the

operator's hands.

There and a

-10

Becau

distri

### Pope Balancing Kit

To meet the need for equipment for quickly and accurately balancing grinding wheels, the Pope Machinery Corp., Haverhill, Mass., has placed on the mar-







April, 19



m

m

ge ze ed

er-

he he

OD

ch

ht

le-

28.

he

a

to

on

80

ge he

d-

In a wide range of sizes the

## **Bondiru** Patented FLEXIBLE COUPLING

will transmit from fractional H. P. to

There are only 3 parts—two metal flanges and a non-metallic "spider" or flexible insert—to carry the load in compression.

Because of its construction the load is evenly distributed and misalignment overcome.

Manufactured by



## LONGER LIFE

for TAPS AND REAMERS

Instead of discarding taps and reamers that produce oversize or bell-mouthed holes, try this simple experiment. Change over to a Ziegler Floating Tool Holder and see if the real trouble isn't faulty spindle alignment.

By compensating automatically for inaccuracies in the alignment of the spindle with the work, the Ziegler Holder makes it possible to turn out first class work even if the spindle is out of alignment as much as  $y_0^{\rm tot}$ .



W. M. ZIEGLER TOOL CO. 1924 Twelfth St., Detroit 16, Mich.

Diegler

WRITE FOR CATALOG

PRIVE FLOATING HOLDER

### STEEL STACKING BOXES TOP RIM

18" x 12" x 6" — 16 Ga. with drop handles.....

\$1.27

### IMMEDIATE SHIPMENT



STANDARD SIZES

18 x 12 x 6 . . . 16 Ga. 18 x 12 x 8 . . . 16 Ga. 16 x 10 x 6 . . . 18 Ga. 16 x 10 x 6 . . . 16 Ga.

MADE IN OTHER SIZES

### **BENCH LEGS**

Four sizes. All Welded. Olive Green enamel.

### **BENCH TOPS**

Steel and wood with or without drawers.

Literature on request.

STERLING FACTORY EQUIPMENT CO

183 CHARLES ST. PROVIDENCE, R. I.

## The JONES BACKSTAND IDLER

## PAVES THE WAY TO Better, Faster Grinding

Get high-speed cutting and mirror-like finishes! Convert your grinding and polishing lathes to the fast, smooth abrasive belt method of grinding for better results with the space-saving Jones Backstand Idler. Full details in Bulletin No. 120.

Jones also makes Bench Grinders and a Swing Grinders, as well as special equiperinding and polishing job.

JONES ENGINEERING COMPANY Dept. 8-2

**BULLETIN No. 120** 

ELLWOOD CITY, PA.

Abrasive Belt Grinding Specialists

ket a balancing kit consisting primarily of a wheel holder with adjustable weights, stand, and arbor, the three being assembled as shown and brought to rest so that the tops of the ways of the stand are exactly level crosswise and lengthwise. A simple marking gage furnished with the kit is used to place pencil marks on the rim of the wheel holder



Pope Balancing Kit

while the wheel is at rest. A vertical chalk mark on the "light" or top side of the wheel indicates the direction toward which the weights will be set.

The wheel assembly is then taken off the stand and placed on a bench block also a part of the kit. With the weights adjusted toward the chalk mark, the assembly is placed on the balancing stand again, using the pencil marks to line up the rear edges of the weights and adjusting the weights so that each is at an equal distance from its pencil mark until perfect balance is achieved.

The Pope Balancing Kit is supplied complete with balancing stand, bench block, balancing arbor, wheel holder, marking gage, weight adjusting wrench chalk, and pencil. The kit is suitable for use with wheels up to 8 inches in diameter x ¾ inch wide x 1¼-inch hole.

### Mead "Flat Top" Work Holder

Developed to overcome difficulties encountered in drilling, countersinking. This ap

by a sh

hollow

gineers MORE

## MARK IT QUICKLY

o

e

d

1-



### U.S. HEADS

STANDARD SINCE 1915



The United States Drill Head Co.

1954 Riverside Drive CINCINNATI, OHIO

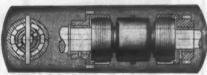
## How PULLMORE CLUTCHES Can Be Shifted From Outside the Unit

NUMBERALL STAMP

A TOOL CO.

Staten Island, N. Y.

This application provides for internal shifting of the PULLMORE Multiple Disc CLUTCH by a shifting rod which operates through the hollow clutch shaft. If your new or improved products present a drive problem, our engineers will be glad to show you how PULLMORE advantages can provide the solution.





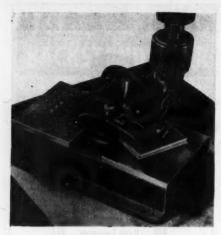
**Huguenot Park** 

SEND FOR THESE POWER TRANSMISSION CONTROL BULLETINS
Show helpful application diagrams. Give capacities, dimensions and specifications.
Describe and show space, time, labor and money saving features of Pullman Clutches

Rockford Drilling Machine Division Borg-Warner
Corporation
300 Catherine Street, Rockford, Illinois, U.S.A.







Mead "Flat Top" Work Holder

and tapping small precision parts in which highly accurate perpendicularity is essential, a work holder to be known as the "Flat Top" has been placed on the market by the Mead Specialties Co., Dept. 14-AA, 15 S. Market St., Chicago,

The fixture is said to be readily adaptable for holding any type of work which is flat on the bottom, varying in thickness from a few thousandths up to a couple of inches and in area from the size of a dime up to several inches square.

In addition to drilling and tapping operations, the Mead Flat Top Work Holder is claimed to be ideal for many operations on small shapers and bench milling machines. At one end, the fixture is equipped with a perforated sup-porting plate having three studs. This end of the fixture is used for milling and shaping work. Two studs are set in position to locate the back of the work, and the third stud is set at the end to support the work against the pressure of the cutting tool. Adjustment for work thickness is made by simply turning the knurled head of a ball-joint stud.

### Anker-Holth High Pressure Hydraulic Fittings

A line of high pressure hydraulic fittings is announced by the Anker-Holth Mfg. Co., 332 S. Michigan Ave., Chicago 4, Ill. Cut from solid steel bar



WORK BENCHES OF STEEL

Write for fully illustrated "Hallowell" bulletins.



#### WOOD STOOLS

Wartime products of the makers of famous "Hallowell" Steel Stools. Made in five sizes, with and without backrests.

Fig. 1926: Pat's. Pend.

Over 40 Years in Business

STANDARD PRESSED STEEL CO. Jenkintown, Pa., Box 556

Boston • Detroit • Indianapolis Chicago • St. Louis • San Francisco

### MACHINE BASES

dily vork g in p to the

ches

opoldop-

nch fix-

sup-

This ling t in ork, 1 to ure rork the

fit-

olth

Chibar





LITTLEFORD BROS., INC.

433 E. Pearl St., Cincinnati 2, Ohio



This small tool steel lob was sawed on the Grob Open End Band Saw in record time. Die illustrated with four openings noleted in 1234 minutes including change over from opening to opening.

Write for our catalog full of hints on hours with the help of Grob's exclusive principle of Band Saw set-up.

### LYON-Raymond **Die Handling Trucks** for Every Need



Lyon-Raymond die bandling trucks are doing a notable job of stepping up efficiency and increasing safety in countless industrial plants.

Lyon-Raymond die-handling trucks are available with capacity up to 30,000 lbs.; pedestal, cantilever or toggle lever types. On some, the hydraulic pump is operated by foot or hand; on others, by electric or gasoline motor. To fit each particular job, certain Lyon-Raymond trucks can be equipped with die separating and turning devices, winch, roller-top table, revolving table and auto-type steering. Most standard designs are carried in stock; others are built on order.

### Ask for

"Die Handling Made Easy," a bul-letin showing various methods proved efficient in many shops.

### LYON-Raymond

Corporation

stock, these fittings are constructed for hydraulic working pressures up to 3,000

pounds.

Pipe connections are % inch, and sold-ered connections are for ¼-inch O.D. x 0.050-inch wall seamless steel tubing. Standard high pressure assemblies include a check valve which is reversible by placing steel ball ahead of spring; safety valve which is spring-loaded and adjustable; straight connection; tee and elbow assemblies; and % and 1/2-inch four-way operating valves.

According to the manufacturer, every

fitting is designed with a factor of safety of 50 per cent and is hydraulically

tested before shipment.

### Lincoln "Fleetweld 37" Arc Welding Electrode

Augmenting its "Fleetweld" group of electrodes, The Lincoln Electric Co., Cleveland 1, Ohio, announces a general purpose arc welding electrode for welding mild steel in all positions with either alternating or direct current. The electrode, which is known as the "Fleetweld 37," is designed to withstand very high currents, thus allowing for the unusually fast production of weld deposits.

An outstanding advantage claimed for the Fleetweld 37 is the fact that there is absolutely no slag interference when welding in vertical down position. Since it will neither stick to nor burn through the work when used with proper currents, the electrode is said to be especially desirable for light gauge welding. According to the manufacturer, welds produced with the electrode have a tensile strength of 70,000 to 80,000 p.s.i., yield strength of 60,000 to 68,000 p.s.i. and ductility (el. in 2 inches) of 18 to 25 per cent.

The Lincoln Fleetweld 37 Electrode conforms to American Welding Society classifications for arc welding electrodes E-6012, E-6013, E-7011, and E-7012. is made in 14-inch lengths and diameters of 1/8, 1/4, and 1/8 inch, and is supplied packed in 50-lb. containers.

### Van Keuren Solid Square Master Blocks

A line of precision gage blocks to be known as Van Keuren Solid Square Master Blocks is now being marketed by The Van Keueren Co., 177 Waltham



Speed your output with Criterion Diamond Tools. The kind of service they give is responsible for the swift, steady increase in their use. Quality of diamonds employed plus a unique method of setting assure extreme rigidity and extra tool life. Special tools made to order following blueprints or specifications. Sharppointed, selected thread grinding tools. Ask your dealer or order direct. Request free literature.

ERION MACHINE WORKS ERLY HILLS, CALIFORNIA

of

April,

### NUMBERALL IMPROVED TYPE HOLDERS

for

ere hen

nce igh

urpe-

eld-

er.

ave s.i.,

3.i.

to

ode

ety des

It

ers ied

be re

ed

m

FOR HAND OR PRESS USE.

SUPER QUALITY STEEL TYPE For stamping into Metal, etc.



### FOR SHOP AND LABORATORY CHOOSE TEMCO!

The Compact Electric Furnace with Many Uses

4 HEAT RANGES low, medium, high, operation to 1500 Fah., intermittent to 1850. Speedy in operation.

INDICATING PYRO-METER - calibrated in Fah. and Cent. Aids temperature control, assures uniform results.

DIMENSIONS-Inside. 4" wide, 3<sup>3</sup>/<sub>4</sub>" high, 3<sup>3</sup>/<sub>4</sub>" deep; outside, 9" wide, 14" high, 10" deep.

(Complete for 115 volts) (\$5 extra for 230 volts).

This handy compact, portable unit is popular in shops and laboratories for heat-treating and many other jobs. Expertly designed and built, "It's a lot of furnace for a low cost." Write for details today.

THERMO ELECTRIC MFG. CO. 488 W. Locust St. Dubuque, Iowa

## PROTECT YOUR OPERATORS

with the STRAND

NUMBERALL STAMP & TOOL CO.

Huguenot Park, Staten Island 12, N. Y.

### **ENCLOSURE** SAFGUARD

Made for blanking, piercing, notching, cutoffs, chute and automatic feeds.

### COMPLETELY ADJUSTABLE

Adjustable to all sizes of dies. Gates can be tilted inward close to die. Staples may be moved up or down to straddle any obstruction.

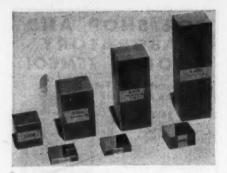
Transparent Shields made for front or sides on request.

### STRAND MFG. CO.

156 N. Desplaines St. CHICAGO 6, ILL.



Safety Engineers Send for our new Circular.



Van Keuren Solid Square Master Blocks

St., Watertown 72, Mass. Blocks up to 1 inch in length are 1 inch square, while 2, 3, and 4-inch blocks are 1½-inches square, thus providing large wearing surfaces. The material used in the blocks is said to be very difficult to lap and to have a hardness of 68 Rockwell C, thereby contributing to long block life.

Van Keuren Solid Square Master Blocks are furnished in sets of 85, 81, and 41 blocks and can also be supplied an individual gages.

### Apco Mossberg Lightweight Torque Wrench

A lightweight wrench for use on light assemblies and delicate products requiring accurate, low torque readings is now being marketed by the Apco Mossberg Co., 112 Lamb St., Attleboro, Mass. Equipped with an aluminum handle and weighing approximately 6 oz., the wrench is available in four sizes for measuring tension in ranges of from 0 to 100 inch ounces, 0 to 30, 0 to 50, and 0 to 100 inch pounds.

Designed to give unusually accurate inch ounce and pound torque readings, the Apco Mossberg Wrench measures torque by the spread between two of several bars in the shank, providing a direct reading on a sturdy brass scale



Apco Mossberg Lightweight Torque Wrench

near the handle. The wrench is said to be ideal for tightening operations on soft, light metals or plastics subject to damage from too much tension.



You can **UP** production
...even with
unskilled labor

From almost any material—steel, stainless steel, brass, aluminum, metal screen, fiber, paper products—even an unskilled worker soon learns to cut intricate combinations of circles, angles, and curves, rapidly, accurately, cleanly. A Libert shear does not nibble. Edges are smooth, need no finishing. Inside cuts are no harder than outside, whether it's flat sheets or formed work. No starting holes are necessary. Write for Bulletin.

CIRCLE CUTTING ATTACHMENT Included as Standard Equipment With This Machine Made in sizes up to 60-in. throat, 10-gauge capacity

1-H 43

Libert HESPEED SHEAR

LIBERT MACHINE COMPANY, GREEN BAY, WISCONSIN

MODERN MACHINE SHOP

334

April, 1944

387 CF Agents i

· Pic

ning

all ne Multip

forgel

A Pro

Produ Over

ter Ce

in Use

Our de

you fi

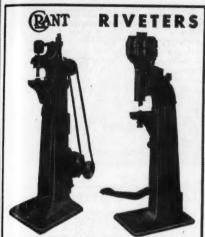
priorit

negres

and a

Send fo

April, 19



e Pioneers in the riveting field. Head rivets from smallest to 5/6" diameter, either by noiseless spinsmallest to % diameter, either by noiseless spinning or vibrating hommer method.—Sizes to meet
all needs.—Types include Vertical and Horizontal
Multiple Spindles. Write for literature—and don't
forget to send samples.

THE GRANT MFG. & MACHINE CO.

96 Silliman Ave.

ght

iirow erg

BB. and ach ing nch 100 ate gs, res of g a ale

h to on

to

ass.

an

ina-

tely,

oth.

ide,

ing

acity

H 43

N

944

**Bridgeport 5, Conn** 



H. LEACH MACHINERY CO.

Agents in all Principal Cities Throughout the World

PROVIDENCE, R. I.

#### CHICAGO STEEL PRESS

No. 253



#### SPEED WAR PRODUCTION OF SHEET METAL WORK

USE FOR ...

1. FORMING 2. EMBOSSING

3. MULTIPLE PIERCING

4. NOTCHING

5. BLANKING

of Ammunition Cases, Bomb Box Liners, Bomb Fins, Aircraft Parts and Many Other Offense Products.

The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

Write for Circular No. 255

#### DREIS & KRUMP MFG. Company

7418 LOOMIS BLVD.

CHICAGO 36

ILLINOIS

387 CHARLES ST.

### HARTFORD 4 Point **MILLING VISE**



SPEED POWER STRENGTH ACCURACY

· One operator, using one hand can manipulate with tremendous power both binding and cam-faced handles.

Operating costs are greatly reduced due to the dual-operation principles of handles used for gripping and releasing.

Maximum strength is provided from semisteel base and movable jaw of single heattreated steel drop-forging. Movable jaw, with its ground fitting surfaces, can accurately hold single piece at either end of jaw.

Write for details

THE HARTFORD SPECIAL MACHINERY CO.

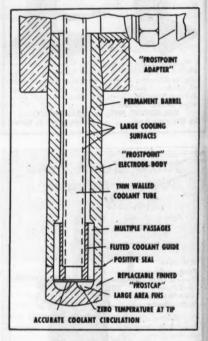
HARTFORD

CONNECTICUT

According to the manufacturer, the Mossberg Lightweight Torque Wrench is now being used for accurate assembly work on radios, magnetos, carburetors, and fuel lines in aircraft. Equally accurate with left or right-hand threads, the wrench is designed to fit standard socket and can be furnished in any square drive required.

#### "Frostpoint" Electrode

High quality welds and increased weld production with a minimum number of electrode dressings are results which are



"Frostpoint" Electrode

said to be obtained through the use of the refrigerated electrode known as the "Frostpoint" now being manufactured by Frostrode Products, 19003 John R St., Detroit 3, Mich. Especially useful naircraft welding, the electrode is claimed to be particularly adaptable to aluminum and aluminum alloys varying in thickness from 0.012 to 0.125 inch.

As shown in the accompanying illus-

April

spe sto

#### SETTLE YOUR GEAR QUESTION RIGHT!

the

orque

netos, craft. -hand to fit

weld er of h are



Cut to today's necessity for precision at any speed. Noiseless. Deliver the power! No stocks. Send B/P for estimate.

SPEED REDUCERS: Worm, spur, combinations. Ask for Catalog.

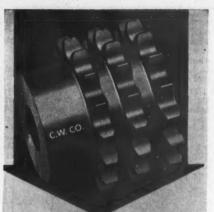


GEAR AND MACHINE CO.

Speed Reducers & Sears

MASSACHUSETTS

Counterbores
High Speed
Back Spot Facers
Core Drills
Flue Sheet Cutters
Interchangeable
and Solids
Also Specials
Write for Catalog



## SPROCKETS

There are over 50,000 CULLMAN Sprockets in stock ready for IMMEDIATE delivery.

If none of the stock sprockets meet your specifications, you can get CULLMAN Sprockets MADE TO ORDER promptly and economically. CULLMAN specialized equipment and experience are your assurance of this.

Write for catalog and essential information for sprocket users.

Cullman Wheel Co.

1352 V Altgeld, Chicago 14, Ill.

e of

the

n R seful e is e to

ying

llus-

tration, the Frostpoint Electrode is made so that its coolant tube concentrates all cooling effect in the electrode proper. The electrode is designed for permanent installation and is tipped with a replace-able "Frostcap," the life of which is said to be approximately equal to that of the conventional electrode.

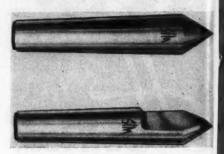
The cap is cold forged from electrolytic copper for high conductivity and is internally finned to provide a maximum cooling area. The structure of the cap is such that the coolant circulates close to the working face of the electrode where the cooling effect is most needed. When one Frostcap has been consumed, another one can be easily slipped onto the permanently installed electrode.

#### Wendt-Sonis Lathe Centers with **Extended Carbide Inserts**

According to an announcement made by the Wendt-Sonis Co., Hannibal, Mo., longer service life has been provided for W-S carbide-tipped lathe centers and half centers by extending the carbide inserts into the shanks of the tools. This extension in each case is approximately

equal to the exposed portion of the tip, thus allowing for extra regrinds before need of replacement should the bearing surface of the tip become damaged.

The centers, which are available in



Wendt-Sonis Lathe Center and Half Center with Extended Carbide Inserts

standard tapers, are said to be guaranteed to a concentricity of within 0.0002 inch or less, thus permitting finish grind-ing and turning to unusually close tol-erances. The centers are claimed to hold their accuracy for a long time due to the wear resistance of the carbide



#### TO IMPROVE PERFORMANCE . . equip your surface grinders with MASTERDRIVE

. it's simple . . . it's complete

By eliminating complicated pulley arrangements and costly lineshaft maintenance, Masterdrives power surface grinders for maximum efficiency and economy.

Masterdrives for surface grinders are engineered as complete units ready to install. No machine work needed. Proper belt tension is maintained at all times.

For information on Masterdrive for your grinders, simply state the make. Masterdrives are supplied in 750 specifications to practically every machine tool drive requirement. Phone, write, or wire today!



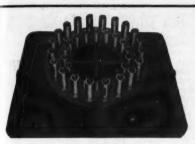
338

FAI

Qui

in s cisio

D



tip,

ring

in

ran-0002

tolto due bide

th

te

and

ace

led.

ply ica-

ent.

944

Pictured: a 38-Spindle Heavy-Duty Drill Head.

DESIGNERS AND MANU-FACTURERS OF MULTIPLE DRILLING EQUIPMENT.

We invite your inquiry.

MICHIGAN DRILL HEAD CO.



Made by Florian Mfg. Co., Plantsville, Conn.

ORDER THROUGH

AMERICAN STANDARD CO.

SOUTHINGTON, CONNECTICU

### Profile Grinder No. 2



#### for FAST, ECONOMICAL PROFILE GRINDING

- Grinds Difficult Contours and Irregular Shapes
- Spindles Operate at High Speed ... 10,000 R. P. M.
- Saves Time . . . No Set-Up Necessary
- Speeds Tool and Die Work and Production
- Two Styles . . . Single or Dual Spindle.

Boyar-Schultz Corp.

2120 Walnut St.

Chicago 12, III.



Federal Model 1141 Thread-Lead Inspection Gage

#### Federal Model 1141 Thread-Lead Inspection Gage

The illustration herewith shows the Model 1141 thread-lead inspection gage now being offered by the Federal Products Corp., 1144 Eddy St., Providence 1, R. I. The gage is adjustable both for

thread lead and diameter. The sensitive contact point is free to float laterally with the axis of the thread and so set itself positively between the sides of the thread itself. The contact is so mounted that it transfers its motion to the dial indicator through a very sensitive mechanism, thus ensuring the accuracy of the inspection operation. The gage is set with a master.

The dial indicator is graduated to read in 0.0001 inch, and the gage has a capacity for threads up to 1½ inches in diameter, a maximum distance between points of 2½ inches, and a minimum distance of ½ inches. By means of a special attachment, a minimum distance of 0.156 inch can be checked.

"Time Saved" is the title of a fourpage folder prepared by the Calder Mfg. Co., 628 N. Prince St., Lancaster, Pa., illustrating and describing the construction and performance features of standard Calder grinding wheel dressers and cutters. The folder also illustrates and briefly describes a new line of "Ga" diamond dressing tools now being offered by the company, as well as a diamond hand tool available in six sizes. Copy free upon request.

#### **ATSKILL** Abrasive Cut-Off Machine CUTS FASTER, SMOOTHER, STRAIGHTER



#### POWERFUL · ACCURATE · SAFE

Cuts solids to 2" and tubing and shapes to 3"-cleanly -without secondary finishing operations.

#### MODEL "W"

Cutting wheel runs in slotted pipe through which coolant is piped. This prevents surface hardening, burr and burn, and insures a smooth. finished cut.

WRITE FOR FOLDER

GEAR BLANKS DIE BLANKS TUBING EXTRUDED BARS CYLINDERS HIGH CARBON STEEL UNANNEALED

STOCK PIPE AND MANY OTHER MATERIALS

CATSKILL METAL WORKS.Inc. CATSKILL. NEW YORK

April

#### GRAHAM MULTI-PURPOSE VISE



#### A UNIQUE PLAIN VISE — A MANY-PURPOSE FIXTURE

Its unique flush design makes this vise extra useful when used plain, while its numerous special attachments convert it to many operations for which special jigs or fixtures would be required.

> ASK ABOUT OUR KNURL HOLDER FITTING LATHE TURRET.

Request new Illustrated price circulars.

#### GRAHAM MFG. CO.

32 BRIDGE ST.

lly et he

ed al h-

of

et

ain en

m c-

of

r-

g.

1 ...

d-

nd

nd

a.-

be

У

6

KS

S

NC

ED

Y

EAST GREENWICH, R. I.

is for the TOUGH alloy steel used to make Thor Stamps.
is for their HARDNESS—scientifically correct.
is for the OLD AGE which Thor Stamps reach in use.
is for the ROUGH treatment

they'll take.



The Pittsburgh Stamp Co. 812 Canal St. Pittsburgh, Pa.



... that's all you hear from a MARQUETTE when it tackles a job of welding in the tool and die shop. But, if you could look under the operator's helmet you'd perhaps find him "grinning like a Chessie cat."

He'd have good reason too, because MARQUETTE'S quick pickup and smooth, uninterrupted flow of matchless welding power prompts a satisfied smile . . . and makes it easy to produce strong, uniform welds for the fast low cost fabrication of all kinds of tools, dies, jigs and fixtures.

Electric welding short-cuts most of the sensitive layout work and saves critical tool steel by hard-surfacing only the cutting edges.

Buy the Best . . . Buy Marquette

Send for free, 24 page, illustrated booklet.

MARQUETTE MFG. CO., INC. Minneapolis 14, Minnesota

MARQUETTE

DA.C. ARC WELDERS

Send for

Samples

Today

### UNUSUAL CAPACITY

for a small machine



Countless toolroom jobs usually scheduled for "too-large" machines can now be profitably performed on the . .

> LINLEY NIGH-SPEED MILLING and JIG BORING MACHINE

Compact construction, simplicity of set-up and changeover. 8 spindle speeds (275 to 4250 r.p.m.), micrometer screw feed head, "no back-lash" quill and many other "Velvet" speed operation features, make the LIN-LEY a tool that earns its keep in any busy shop.

We've had many good boosts for the per-formance of this little precision machine. We think you can use it profitably too.

SEND FOR BULLETIN ... NOW.

CONN. BRIDGEPORT



#### STEELGRIP BELT LACING

A strong lacing for all types of belts. Put on with a hammer in a few minutes. Clinches smoothly into belt, compresses ends, prevents fraying. 2 - piece hinged rocker pins pro-vided. 8 sizes. In boxes, handy packages, cartons and long lengths.

Write for catalog sheets.

#### BELT LACING **Both types from** 1 source

BELT HOOKS come with blue aligning cards that prevent waste-every hook can be used. Protects fingers. Applied with a WIREGRIP or any other standard Belt Lacing Machine. 6 sizes.



ARMSTRONG - BRAY & CO.

"The Belt Lacing People"
west Highway Chicage 30, U. S. A. 5346 Northwest Highway





Cooler dressing Closer telerances Micrometer Accuracy

Because: Wing key heat dissipation and absolute diamond lock nib

Three grades of diamonds. Common quality \$12 per karat. Medium quality \$24 per karat. Select quality \$48 per karat. (Contour template diamonds supplied only in Medium and Select quality.)

in Medium and Select quality.)
All diamond sizes ½ to 10 karat are nib mounted for immediate shipment . . . Billed subject to approval. Specify quality of diamond wanted. We recommend a minimum size of one karat for each 6' diameter of grinding wheel. (24 hour resetting service, \$1.00 post paid.)
Write for Caraiog showing Most Complete Line of Diamond Tools for War Production
Distributed thru Mill Supply Jobbers

DIAMOND TOOL COMPANY, Not Inc.
Sheldon M. Booth, Pret.
938 E. 41st Street CHICAGO ILL



for

n

that

finn o ther Ma-



LETTERS AND FIGURES

- · Will not spall, will not mushroom
- Deeper impression with less exertion
- 25% to 50% more service
- Any size character from 1/16" to 1". Write for Literature.



The Complete Line of Gear and Wheel **Pullers** 



Write for Cat-alog Sheets showing STEELGRIF and 3 arm

Wheel Pullers,
special Battery Terminal, Pitman Arm, Fan
Pullers and CHAINGRIP Universal Pullers.

#### ARMSTRONG-BRAY & CO.

"The Belt Lacing People" 5346 Northwest Highway, Chicago 30, U.S.A.

#### "BURR-OFF"



For Removing Burr or Chamfering Holes and Slots of Fork-Shaped Parts. EFFICIENT • DURABLE • SIMPLE • INEXPENSIVE

#### TOOL IMPROVEMENTS CO., INC.

SEAFORD. NEW YORK

FOR SALE THROUGH John H. Graham and Co., Inc., 105 Duane St., New York, N. Y.

344 MODERN MACHINE SHOP April, 1944

(5 with

U

sio

For

mil chi me

rad lath

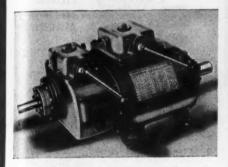
(10 with

sh fre

M 340

April

## western "SUPER" up to 30 H. P. with SPEED CHANGES in geometric progression of 1.29 (total red. 6:1)



.... Western MASTER (5 h. p. capacity) transmission with bracket ..... \$95.

(The MAJOR and MASTER have four speeds forward and reverse.)

We can supply necessary V-belts, sheaves, output pulleys and motors from stock. Prompt deliveries on high priority.

### WESTERN MANUFACTURING CO. 3400 SCOTTEN DETROIT

#### A RADII & ANGLE DRESSER OF PRECISION AND VERSATILITY



An instrument of precision and versatility... Operation is simple requiring no high degree of skill for accuracy... Any one of the following can be produced with one setting:

One angle
Two angles
Concave radii up to 3º
Convex radii up to 3º
Two Angles and radius.
Many other diversified forms to meet requirements.

Wheel size capacity—14" dia.; angular travel 3"; for use on universal surface and cylindrical grinders.

Full details available on request.

MANUFACTURED BY
J & S TOOL CO. 177 Main St. Fast Orange SN L
PRECISION DRESSING TOOLS



#### AND SPEED JOBS

Read what experienced machine shops write:

"Eliminates burning entirely"

"Am enabled to use centers indefinitely"

"Can increase speeds without undue heating"

MADE especially to lubricate dead centers of lathes. Provides effective protection against overheating, softening and scoring. Increases production and promotes accuracy by permitting heavier cuts, IN HANDY TUBES higher speeds and tighter set-up.

1, 4 and 8-oz. at your regular supplier or write for folder LC69.

Use it also for steady rests, jack screws and other applications where a lubricant of extreme film strength is required.



JOSEPH DIXON CRUCIBLE CO., JERSEY CITY 3, N. J.



FILING FITTING MARKING

Solve Difficult Angle Jobs

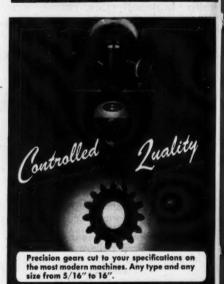
\*For Tool Room—Production Line—Bench.
\*Speed up work—End Makeshift Methods.
\*Quick Accurate Setups at an any angle.
\*Sturdy Longlife Construction.

\*All Paris Accurately Machined.
\*Jaws Hardened Steel—Plain or Grooved.
\*Made in Sizes from 1 ½" to 8" Jaws.
Write for circular R-4 "101 Angle
Operation" and complete line of

PALMGREN Vises.

CHICAGO TOOL & ENGINEERING COMPANY
Mirs of PALMGREN PRODUCTS for over 25 years

PRECISION WORK AT ANY ANGL



DETROIT BEVEL GEAR CO.
BIJB JOSEPH CAMPAU AVE. \* DETROIT 11, MICH.
Makers of Quality Gears for 30 Years

Apri



Install a Metro Metallizing Gun in your shop, and even the most unskilled help can put on metal where wear or machining errors have taken it off...quickly, easily, accurately, and without fear of damaging the original part! Any metal can be sprayed on any base! Cost is but a fraction of new parts! Process can be repeated almost indefinitely! Results are invariably better than new! Two Guns meet your price and priority needs! Return coupon for complete details.



WORLD'S FINEST METALLIZING EQUIPMENT

MATT.	COUPON	FOR	FREE	SAL	VAGE	DATA

METALLIZING ENGINEERING CO., INC.
38-22 30TH STREET, LONG ISLAND CITY 1, N. Y.
Send February Metoo News—also literature, prices,
and priority data on equipment.

Name-

Title\_

Company.

MMS.4/44

Address

April, 1944

NG

ING

IG DING

MODERN MACHINE SHOP

347

"OH-38" an element of Victory!
EASILY MACHINABLE



An Aluminum Alloy-Non-Heat Treated, The perfected metal that surpasses all others for a wide variety of machining operations. Non-conrosive-Easy on machine tools - Holds threads without stripping. Its light weight reduces table and machine loads and increases tooling accuracy, 5 years of proven superiority in hundreds of plants. OH 38 is an exclusive Hedstrom product.

Write for Literature

Manufacturers of Aluminum, Brass, Bronze and High Conductivity Copper Castings. Pattern Makers Complete Mechanical Assemblies and Models to Specifications

OSCAR W. HEDSTROM CORP.
4842 West Division St., Phone Columbus 3667, Chicago, Ill.

#### Robertson's ECONOMY Power Hack Saws

**FEATURES** 

Rugged Simplicity
Hairline Accuracy
Long Blade Life

Long Life High Speed Large Bearings

Few Adjustments Hydraulic Lift on Back Stroke

Write for information and delivery dates.



There is a ROBERTSON ECONOMY SAW for every cutting job

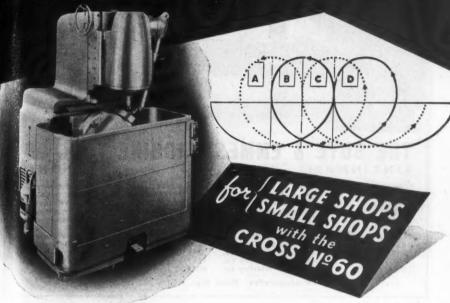
W. ROBERTSON

MACHINE & FOUNDRY CO., INC.

52 RANO ST.

BUFFALO Z. N. Y

HIGH SPEED AUTOMATIC Gear Tooth Pointing



Continuous rotary cutting with an economical hollow mill enables the Cross No. 60 to point 1800 gear teeth a minute under average conditions. The diagram illustrates this Cross idea of synchronizing the motions of the gear and the cutter to produce more work accurately and automatically. The solid line traces the path of one cutter lip, the dotted line the path of the other.

And several exclusive Cross features make the No. 60 ideal for smaller shops where short runs on a variety of gears are normally required. For instance, set-ups can be completed by inexperienced or unskilled operators within 20 minutes. The work is clamped by means of foot-pedal control, so that the operator's hands are free to feed the machine. Standardized work-holding fixtures accommodate a wide variety of gears.

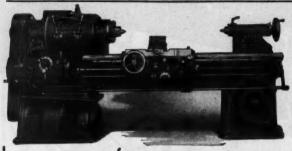
These and other features of the Cross No. 60 are explained in a special bulletin which is yours for the asking. Just write The Cross Company, Detroit 7, Michigan.

CROSS

Machine Tools

b

and High



## **Engine Lathes**

### THE BOYE & EMMES MACHINE TOOL CO-

BIRMINGHAM Pratt & Whitney	0
BOSTON Pratt & Whitney C	
CHICAGOP. P. Wagener, Wilmet	te
CINCINNATI Pratt & Whitney C	e.
CLEVELAND Pratt & Whitney C	
DETROIT D. E. Morand Machinery C	0.
DULUTH	
GRAND RAPIDSJoseph Monahi	
HARTFORD Prett & Whitney C	
HOUSTON	
LOS ANGELES Pratt & Whitney C	0.

MILWAUKEE Nicho	Machinery Co.
NEW ORLEANS. Woodward, V	Vight & Co., Ltd.
NEW YORK CITY Pratt	& Whitney Co.
PHILADELPHIA Pratt	& Whitney Co.
PITTSBURGHRees	
RICHMOND	
ROCHESTER Pratt	& Whitney Co.
ST. LOUIS Prati	
SAN FRANCISCO Pret	
SEATTLE Buckner-Wee	
TOLEDOFre	

Canadian Representative: Meore Bres. Mach'y Co., Ltd., Montreal

#### simplified

with PARKER-MAJESTIC

Internal and External Grinders

For precision grinding . . . internal or external . . . Majestic simplicity of design and flexibility of changeover guarantee maximum grinding output at low cost.

Send for descriptive circular .. NOW!

Representatives in all principal cities





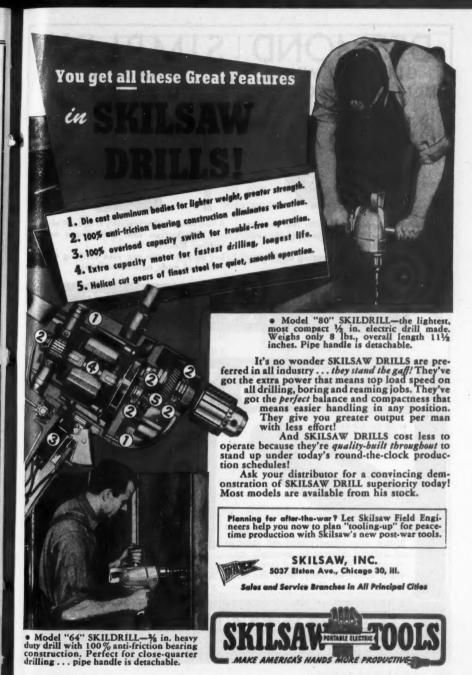
350

MAJESTIC TOOL & MFG. CO.

2950 EAST WOODBRIDGE

DETROIT 7. MICHIGAS

Apr



1944

0

o. o. o. o. o.

### DESMOND GRINDING WHEEL DRESSERS and CUTTERS



We can supply you with the proper Dresser and Cutter for all of your grinding wheels.

Ask for capy of our catalog and name of your negrest dealer.

SIMPLEX
Steel Slide
VISES



A full line of Machinists', Filers, Welders, Production and Drill Press and Milling Machine Vises.

Let us send you our vise catalog and name of your nearest dealer.

THE DESMOND-STEPHAN MFG. CO.

### WILLEY'S TORPEDO TYPE WHEEL DRESSERS

Write for Latest Prices and Catalog.

Many scientifically spaced layers of natural diamonds, securely anchored in Willey's Metal that holds each stone securely, until the last stone is used. Unequalled in per-



formance and low-cost dressing. Available in four sizes, to meet your wheel dressing requirements.

WILLEY'S CARBIDE TOOL CO.

NOTE MAKERS OF BREEKS MELLE

1342 W. Vernor Highway

Detroit 16, Michigan

Apri



#### ON HIS WAY . .

and he'll put it over bigger and faster when he and millions of others know we're backing them up. Production will do it... production on the vastest scale ever known in all history.

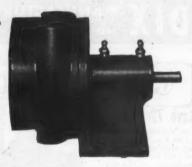
#### COOLANT PUMPS AND VALVES

is our job to help your job.



#### COOLANT PUMPS

Scores of models and any special design you may need. Illustrated is Model NOR for either belt drive or direct connection to motor. Oil-less bearings.



Model NOR 1/2-in. pipe size with priming chamber. Model AOR 3/4-in. pipe size without priming chamber.

#### HYDRAULIC OIL-RELIEF VALVES

Non-chattering. Pipe sizes 1/4" to 2"; for pressures 0 lbs. to 350 lbs.



Write for mechanical data book.

ZFLO) Specialties Co., Inc.

## LATHE PRODUCTION Here are two real production boosters for sur-

prising increases in both output and accuracy.

#### MULTIPLE CARRIAGE STOP

 Increases efficiency of both skilled and unskilled workers—reduces scrap—increases output up to 100%—4 accurate indexed positions. For 9, 10, 12 inch lathes \$12.50; larger sizes in proportion.

#### AUTOMATIC COLLET CLOSER

• Fits lathes with 3/4" spindle hole—accommodates 1-A collets. Positive locking—ball bearing adjustment—no sleeves—no pins—no liners—rust proofed—quickly installed. Price \$50 complete. Immediate delivery, AA5 priority req. on both. Send for ill. Catalog.



State size and make of lathe.

MANUFACTURING COMPANY

3447 EAST PICO BLVD. LOS ANGELES 23, CALIF.

PRECISION MADE PRODUCTS

BU

WAR

#### POSITIONERS

The Norberg Manufacturing Co., Milwaukee, has eliminated 72 lifts per unit by using a C-F Positioner on the production job illustrated. These complex weld-ments (Scavenging air headers for large Die-sel engines) have to be "procedure - welded" and formerly required 72 crane lifts which took an average of 20 minutes apiece.



Now, the C-F Positioner moves the weldment through the routine positions under a push button control saving 24 hours crane time, 24 hours crane operator's time, and the same of both a sling man and the welder's time per weldment . . . in other words saving three man-days and one crane-day on each header produced.

C-F Positioners come in 6 sizes—capacities to 30,000 lb. All are pedestal mounted, rotate 360° and tilt to 135° beyond horizontal. Write for Bulletin WP-22.

CULLEN FRIESTEDT CO. 1311 S. Kilbourn Ave. Chicago 23 U.S. A.



### "PIERCE-FORM WITHOUT A PRESS"

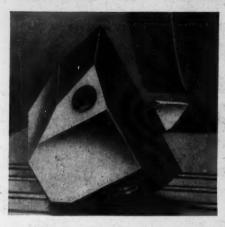
BUY U.S. WAR BONDS

WRITE US
FOR
CATALOG
SHOWING
IYDRO-PIERCE

MID-WEST HYDRO-PIERCE UNITS are STANDARD for the single or multiple simultaneous piercing of any number of holes in any direction in intricate shaped stampings. Let us solve your piercing problems. Our able staff of engineers is at your service. A MID-WEST HYDRO-PIERCE MACHINE engineered, designed and built for your particular problem will prove economical in time, money and manpower, and by the subsequent rearranging of units can be made to provide for future models or changes.

#### MID WEST HYDRO PIERCE INC.

8201 ST. AUBIN, DETROIT 11, MICHIGAN MADISON 6824



### PRECISION GRINDING SIMPLE WITH THE NEW CLARK THREAD TOOL GRINDING FIXTURE

This fixture insures accuracy and uniformity in grinding National 60° and Acme 29° thread tool bits. With this fixture, bits are right the first time... thus saving labor. Magnetic chuck convenient but not necessary. Two standard sizes available for tool bits from 1/8" to 3/8". Model A for the mechanic's own tool kit... and Model B for the shop. Special Model C for grinding Clark Hole Cutter Blades.

Order today from your jobber or write for Bulletin No. MMS-4

In Canada: DOMINION BEARINGS, LTD., Toronto, Montreal, Winnipeg Export: THE AMERICAN STEEL EXPORT COMPANY, INC., New York, Los Angeles

Robert H. Clark Company

9330 Santa Monica Boulevard Beverly Hills, California



Ap

## Why this TAPPING HEAD is better



Exclusive design features in Procunier Tapping Heads assure faster, more accurate tapping—with less tap breakage. The Tru-Grip Tap Holder, for instance, weighs one-third as much as conventional chucks, which kills fly wheel effect and promotes more accurate tapping. The tap holders have small outside diameter—%" for No. 1, 1" for No. 2, 1%" for No. 3—which permits use of tapping head in hard-to-get-at spots. Shank is one piece, heat

treated and precision ground. Tap is driven by square and held true by the round. Many other features include: Dry, double-cone friction clutch that won't wear and can't absorb oil; makes bottom tapping easy; ball bearings; three point balanced, heat-treated gear reversing mechanism, which distributes pull and greatly reduces strain.

#### Send for bulletin

giving full details, description and prices on complete line of Pro-

cunior Precision Tapping Heads to meet all needs, the new tru-grip Tap Holder—and also the full line of Procunier Universal Tapping Machines, hand, foot, or air-operated.

#### **PROCUNIER**

SAFETY CHUCK CO. 12 S. Clinton St. CHICAGO 6, ILL.

PROCUNIER	SAFETY	CHUCK	CO.,
12 S. Clintor	St., Chi	cago 6,	111.

Send me bulletins on: 

High Speed Tapping Heads Tru-Grip Tap Holders

Universal Tapping Machines.

City..... State.....

1944



#### For Better, More Accurate Chip Breaker, Grinding and Diamond Wheel Finishing

Hammond engineers now present to you this new Heavy Duty Chip Breaker and Tool Grinder with all the latest, practical operational features for fast, accurate chip breaker groove grinding and diamond wheel finishing.

It features the new Any Angle Vise (standard equipment) that gives you an easy, simple method of obtaining correct grinding angles.

1/2 HP motor—V-belt drive permits the use of any electrical specifications.

Hammond Machinery Builders, Inc. 615 Douglas Ave., Kalamazoo, Mich.
Gentlemen: Please send data on your complete ine of Carbide Tool Grinders.
Company
Address
CityState
AttentionPosition



358

Han

iobs.

belts

conv

tion 15"

design the N

Apr

No. 11/4 HAND FEED SURF ACE GRINDER Hand Feed . . . ideal for short-run precision jobs. Motor integral with wheel head - no belts, sprockets or chains. Large hand wheels, conveniently located, permit continuous operation with minimum fatigue. Unusual capacity: 15" long x 10" wide x 12" high. ABRASIVE design and precision workmanship recommend the No. 11/2 for the finest type of flat, form and gage grinding.

ABRASIVE

Send for Bulletin and Complete Specifications

ABRASIVE MACHINE TOOL CO · EAST PROVIDENCE 14, R. I. · Dealers in Principal Cities

April, 1944

ES!

ing

dard

mple gles. se of

1944

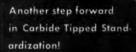
MODERN MACHINE SHOP

359

### Announcing—

### THE NEW SUPER STANDARD

CARBIDE TIPPED
SHELL END MILLS
AND FACE MILLS!



Write TODAY for literature, prices and complete details of these Super quality, economical Carbide Tipped Cutters.



Carbide Tipped Tools

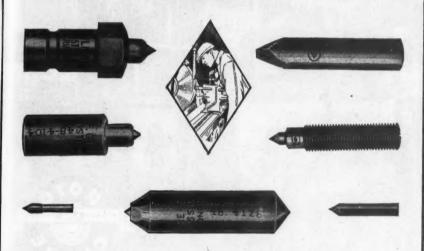
21650 Hoover Road, Detroit 13, Michigan

4105 San Fernando Road, Glendale 4, California

Apri

EXPERIENCED OPERATORS FOR MANY YEARS
HAVE PREFERRED

### GILMORE DIAMOND TOOLS



From Needlepointed Diamonds for delicate shaping of thread grinding wheels, up to husky diamonds that can take care of heavy centerless-grinder wheels, these tools stand the test for economy and satisfaction.

Circulars on request.

#### F. F. GILMORE & CO.

285 Columbus Ave.

Boston (16), Mass.

944

# AGNESIUM DUST AGNESIUM DUST AGNESIUM DUST



If the dust is dangerous or explosive, such as magnesium dust, the AAF type N ROTO-CLONE is the answer to your problem!

The Type N is available as shown as complete self-contained boothbenches for grinding, buffing and polishing, or in large sizes for serving a central dust exhaust system. Type N collection is safe because precipitation is under liquid and the unit contains no restrictions, ledges or recesses where dust can collect. If you have a dust problem write us for "AAF in Industry"-which describes our full line of process and atmospheric dust control equipment. There is no obligation.



AMERICAN AIR FILTER COMPANY, INC., LOD CENTRAL AVE, TOUISVILLE, BY.

IN CANADA DABLING BUSTHERS LIMITED, MINTERAL P. I.

from 1 the te can h form bearin

undes

A larg the Pr has tu to a re ican N 1. The gear is gear. 2. The may o 3. Sh finish. 4. Din ly mai 5. A to gri Red 1 angle.

# Ghaving Replaces GRINDING

FUR AIRCRAFT ENGINE GEARS

A large motor company manufacturing the Pratt & Whitney Aircraft Engine has turned to gear shaving, according to a recently published article in American Machinist, for several reasons:

 They find the quality of the shaved gear is equal or superior to the ground gear.

2. There are no burnt teeth such as may occur with grinding.

3. Shaved gears have a better final finish.

4. Dimensional tolerances can be closely maintained.

5. A gear which requires 40 minutes to grind can be shaved in 5 minutes. Red Ring Rotary Gear Shaving corrects cutting errors of index, helical angle, tooth profile, eccentricity, and undesirable tooth roughness of gears from ½" to 96" P.D. On these machines the teeth of gears from ¾" to 36" P.D. can be shaved to the ELLIPTOID form (crowned) to eliminate "end bearing."



WRITE FOR DESCRIPTIVE FOLDER ON RED RING GEAR SHAVING

#### NATIONAL BROACH AND MACHINE CO.

RED RING PRODUCTS

BEOD ST. JEAN . DETROIT 13, MICH.

SPECIALISTS ON SPOR AND HELICAL INVOLUTE GEAR PRACTICE URIGINATURS OF ROTARY SHAVING AND FILIPPOID TOOTH FORMS

S



### os s zwilliam zau



3944 Forbes Street Pittsburgh 13 Pa.

Branch Plants

New York, Boston, Chicago, Philadelphia, Newark, Syracuse

District Sales Offices

Cleveland

District Sales Offices
Detroit Hartford

Birmingham

364 MODERN MACHINE SHOP

April, 1944

April,

These

reconv simple

of spe the "co



These streamlined units deserve a place in your reconversion—because they're flexible, rugged, simple, safe, easy to operate, and offer a wide range of speeds for cutting practically any material. On the "costs" side, Walker-Turner Machine Tools show

marked savings in power consumption, capital investment and operating expenditures. And fast delivery...to help you avoid reconversion delays... will be another Walker-Turner feature.

WALKER-TURNER COMPANY, Inc., Plainfield, N. J.



(20" Drill Press)
Automatic power feed is a feature of the
newest Walker-Turner 20" Drill Press.



(Metal Cut-off Machine)
"Kick" cutting with a Walker-Turner
Radial Cut-off machine.



(Band Saw)
Cutting a special profile in plastics with
a Walker-Turner Band Saw.



#### MACHINE TOOLS

DRILL PRESSES - HAND AND POWER FEED . RADIAL DRILLS
METAL-CUTING BAND SAWS . POLISHING LATHES . FLEXIBLE SHAFT MACHINES
RADIAL CUT-OFF MACHINES FOR METAL . MOTORS . BELT & DISC SUBFACES





PROMPT SHIPMENTS NOW ON BOTH TYPES

The self-aligning feature of Alco Die Holders is pointing the way for wise manufacturers to cut costs by reducing set-up time. Only three things to do . . . tighten die in die cap . . . run die slowly on work for correct alignment . . . tighten two studs in the flange and start production.

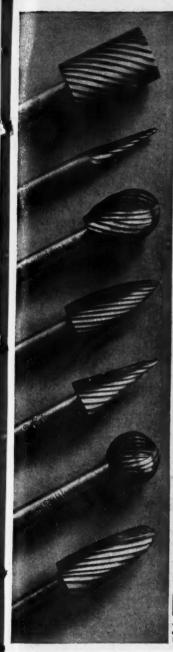
And don't overlook the lowly button die . . . it's simple but efficient when used in the Alco Button Die Holder.

#### ALCCTOOLS

THE ALCO TOOL CO. 152 BIRDSEYE ST.

Detroit: 908 Stephenson Bldg.

Chicago: 6219 S. Kenwood Ave., Hyde Park 6807





#### GROBET FILE CO. of AMERICA

421 Canal Street (112)





YOU HAVE A TOGGLE C-CLAMP WITH

#### **GREATER STRENGTH • LIGHTER WEIGHT**

Added strength has been given this clamp (Model 505) by forging, which also permitted the redesigning to effect a reduction of 17% in weight.

Throat capacity was increased where it was most needed. The clamp now possesses

better balance which makes for easier handling. A wing nut supplants the knurled head to facilitate original adjustment.

Once adjusted for required thickness, clamp remains at that setting for repeated clampings. No screwing or unscrewing necessary.

KNU-VISE

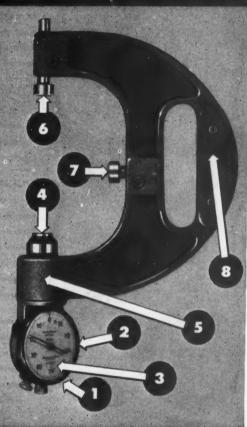
2201 EIGHTH STREET, DETROIT 16, MICH.
4328 SAN FERNANDO ROAD GLENDALE, CALIF.

April,

### SHEFFIELD SNAP GAGE

FOR INSPECTION AND CLASSIFICATION

- I Gage may be used with dial either at the bottom or the top, whichever is more convenient.
- 2 Dial is adjustable radially and can be swung through 360° to facilitate reading.
- 3 Scale has a range of .005"—each graduation .0001".
- 4 Movable anvil is spring urged for constant gaging pressure, but spring has no effect on indicator. Special spring pressures available.
- 5 Movable anvil bearing is long enough to preserve alignment with the fixed anvil.
- 6 Fixed anvil is adjustable to a maximum of one inch.
- 7 Adjustable backstop has a cylindrical face for accurate line contact.
- 8 Comfortable liandle with plastic grip to insulate gage from heat of inspector's hand.





#### THE SHEFFIELD CORPORATION

Daylon 1, Ohio, U.S.A.

MACHINE TOOLS - GAGES - MEASURING INSTRUMENTS - CONTRACT SERVICES

14

### Where the - Impossible In Precision Is Achieved



AFOULD you have believed ten years ago that more than 1,200,000 threaded holes could be gaged with one thread gage? That sort of gage performance is no longer considered un believable . . . simply because Lincoln Park tackled the "impossible" job of producing Carboloy thread gages and came up with the right answer . . . and because gages manufactured by Lincoln Park of this wear-resistant material are regularly providing the same long, accurate service life in all types of high production inspection.

The development of Carboloy thread gages is only one of many new ideas in gage-making which originated at Lincoln Park. Each has contributed materially to modern gaging practice. None would have been possible had it not been. for the unusual ability of the Lincoln Park organization to solve the toughest problems in extreme precision work.

There are more new developments in progress at Lincoln Park. You can be sure that some of the most important future advancements in the manufacture of gages and precision tools will come from the plant "where the 'impossible' in precision is achieved."



Successor to The Lincoln Park Tool and Gage Company and Carbur, Inc.

1733 FERRIS AVENUE LINCOLN PARK 25, MICHIGAN

April, 1944

MIDGE Sagina

Chicag

April, 1



## Send Your Worn Cutters to the Nearest Severance Plant

In the six modern, completely equipped Severance plants in the United States, the renewing of worn, dulled rotary cutters has become as much of the daily business as the manufacture of new tools.

Actually, the regrinding of your worntools requires the same experience and the same precise skill as used by Severance craftsmen in the manufacture of new Severance tools. Each flute is given the correct pitch and depth so the finished tool will not chatter. Each edge is carefully ground so the renewed tool will take the same deep, sharp bites as a new tool. And after being accurately reground, your tools are further improved by the exclusive "Severite" heat treat process that gives additional hardness to the teeth and increases their cutting life — between regrinds — from three to five times.

Check up on the worn and dulled tools in your plant now. For best service, send them to the Severance plant nearest you for a factory regrinding job.

Severance

MIDGET MILLING CUTTERS • PRECISION REGRINDING • Severance Tool Industries Inc., Saginaw, Mich. • Plants in Long Island City, 1, N. Y.; Detroit, 2, Mich.; Fort Wayne, Ind.; Chicago, 6; and Los Angeles, 21. In Canada: 60 Front Street West, Toronto, Ontario.

uld of un ark

ing the acant ng,

ing onice.

en.

ark in

-055

of

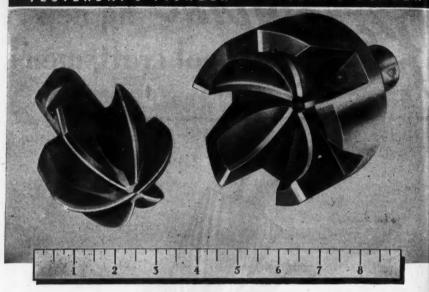
the

will

' in

44

YESTERDAY'S PIONEER · · · TODAY'S LEADER



## Special WELDON Cutting Tools for Creating Ball and Socket

THIS pair of WELDON cutting tools, specially made to close limits for the purpose of creating ball and socket, accurately turns out a job that ordinarily is considered quite difficult.

It is only one of many thousands of special tools made to order by WELDON which indicates the type of work WELDON is fully equipped to do.

If you have a special cutting tool problem our experience and skill in this field are at your service.

We can make immediate shipment of most sizes of WELDON End Mills. Write for Stock List.



# ATKINS Silver Steel Blades

# Means FEWER CHANGE-OVERS ON MACHINES

● Tool change-overs are one of those "necessary wastes". Expensive machines stand idle, valuable workers mark time, production stops while a worn tool is replaced. The responsibility for holding such "necessary wastes" at rock-bottom is one of the toughest jobs plant men face. For thousands, this problem has resolved itself into using Atkins Silver Steel Blades for all metal cutting. These fomous blades with the "Blue Ends" have the remarkable endurance of Silver Steel—the ability to cut fast over long periods. These are points that Atkins Engineered Cutting Service is prepared to demonstrate in your plant on work of your choosing. Write today for information.

E. C. ATKINS AND COMPANY, 466 S. Illinois St., Indianapolis 9, Ind.

All attent Silver Steel Blanca have the "Blacklast", a pool for capellor performance these Athless plopsered by a role of athless plopsered by a role of these for performance these two deceder bys.

TOOLS ARE WEAPONS ... TREAT 'EM RIGHT



All of the great variety of small parts you see in this picture were deburred mechanically, in quantity, by the Roto-Finish process. This revolutionary new method of mechanical finishing is used with equal success on steel, brass, aluminum, stainless and nickel steel parts... on castings up to 75 pounds, as well as the tiny, delicate, threaded parts shown here.

Hundreds of plants are using Roto-Finish today to effect important savings in time and costs over hand methods of de-burring, grinding, honing, and buffing. Precision tolerances are maintained and far better finishes secured. Send for complete information and let us process samples of your parts—without charge.

## THE STURGIS PRODUCTS CO.

253 JACOB ST., STURGIS, MICHIGAN

## FROM THE FILES OF "AMERICAN SWISS" FILE SERVICE

"We use 'American Swiss' SwissPattern Files on tool and die work
because they hold their edges longbecause they hold their edges longtried. They give us servtried. They give us service at minimum cost, and
ice at minimum cost, and
our men are more satisfied when using them.

This user has concisely expressed three important reasons for his preference of "American Swiss" Files...LONG WEAR ...LOWER FILING EXPENSE ... MORE SATISFIED MACHINISTS.

Send for the "AMERICAN SWISS" File Catalog Thousands of plants all over the country have learned that "American Swiss" Swiss-Pattern Files are an investment that pays big dividends. It will pay you, too, to standardize on these precision tools...made in 3000 different shapes, cuts and sizes. Obtainable from our Distributor.

American Swiss File & Tool Co., Elizabeth, N. J.

ask for them By NAME American Swiss \*\*

SWISS PATTERN FILES



War plants are Staining more production per man-hour with Niagara Power Squaring Shears because of accurate cutting, quick setting, ball bearing, self-measuring parallel back gages, full visibility of cutting line, instant acting Niagara sleeve clutch and other modern features.

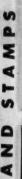
Enclosed drive with gears, clutch and eccentrics running in oil assure long life and low maintenance coft. Four-edge, solid tool steel knives are standard equipment. Niagara Machine & Tool Works, Buffalo, N. Y. District Offices: Detroit, Cleveland, New York.

Shear knives available for cutting ally and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory regranding service by the same skilled men who grind new Niagara knives.

# BONDS STATES

UNITED

BUY



R BONDS AND

TATES V

TED ST

LNO

BUY





# DO YOU NEED GAGE BLOCKS IN A HURRY?

These Ellstrom made Chromium Plated Gage Blocks are now being delivered reasonably fast to those manufacturers who are doing vital war work.

The photograph above shows Set No. 31 containing 31 blocks ranging from .050 to 4 inches in size.

There are other Dearborn Gage sets available, a complete description including prices of these will be sent to you upon request. Wire or write us today or contact your nearest Dearborn representative.



Iriginators of Chromium Plated Gage Blocks



SUPERFOWER Recomputer Magnetic Checks are made in states from 4" x 8" to 24" x 86" work surface SUPER-POWER design represents the highest development of modern magnetic chucking Rugged, rigid, durable, electrically correct of work-piece...
and for angular work, too...

# SUPERPOWER Magnetic Chucks

AND ACCESSORIES

TO DO YOUR JOB

SUPERPOWER. Precision Duplex Bass Magnetic Chuck is one of four styles of adjustable-base chucks for

SUPERPOWER. Precision Duples Basin Magnetic Check is one of four styles of adjustable-base chucks for precision angular work. Swivels to 90° either side of horizontal, tilss to maximum angle of 14°. Sizes 4" x 8" to 6" x 18" work surface.



TAFT-PEIRCE Double-Unst Demagnetizer quickly removes residual magnetism from work.





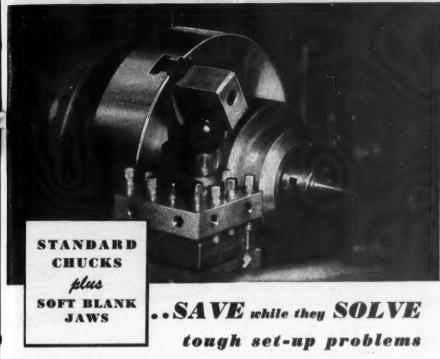
SUPERPOWER Universal Magnetic Parallels and V-Blocks increase chuck utility—especially on parts of irregular shape.

To speed set-ups and widen machine work-range, there are types and sizes of Superpower Magnetic Chucks adaptable not only to grinders but also to millers, planers, shapers, lathes, and other machines. These all-steel, waterproof chucks have greater magnetic power, larger magnetic area, and a heavy

concentration of flux at the face plate to increase versatility of set-up. Full details on the full line of rectangular, rotary, and special models, with control-switch and demagnetizing equipment, are given in the Superpower bulletin. Write on your letterhead for a copy now.

The TAFT-PEIRCE MANUFACTURING COMPANY WOONSOCKET, RHODE ISLAND





WITH the development of the American Standard two-piece jaw construction, it became very easy to hold work of unusual shapes or dimensions in standard chucks simply by machining a set of soft blank top jaws to the required form. This saved a great deal of the time and material previously put into construction of special work-holding devices and also made it

possible to quickly change a machine over from one job to another by merely exchanging the removable top jaws in the chuck.



This is typical of the time and material saving short cuts that.. in a thousand little ways... have enabled American Industry to out-produce our enemies before they thought we could get started. They are going to help make reconversion to civilian production equally successful.

Let Cushman work with you on present and future work-holding problems... and in the interests of Tool Conservation. The Cushman Chuck Company, Chucking Engineers Since 1850 Hartford L. Conn.

A WORLD STANDARD FOR PRECISION



OUSHMAN OHUOKS

iven head

# Report on How Tool Report on How Tool Report on How Tool Report on How Tool Increasing Tool Users are Increasing Tool Users are Increasing Tool Life Through Life Through Industrial Chilling Machine Industrial Chilling Machine

• Hundreds of manufacturers are now using the Deepfreeze Cascade Industrial Chilling Machine for cold treating of finished "ready to use" stock tools. Here are a few stories of remarkable increases in tool life obtained

by cold treating in a Deepfreeze

**DRILLS**—On  $^{21}/_{32}$ " drills, tool life was increased from 70 holes to 700 holes per grind by cold treating at  $-120^{\circ}$  F. in a Deepfreeze.

**TAPS**—Tap life is increased from 40 pieces to 710 pieces per grind by cold treating.

**SAWS**—On a sawing operation on  $5\frac{3}{4}$ " round Mehanite cast bars, a 100% increase in cutter life between sharpenings was obtained after cold treating for two hours at  $-120^{\circ}$  F. in a Deepfreeze machine.

MILLING CUTTERS—On a gang milling operation on 4340 steel it was formerly necessary to resharpen cutters every 7 hours. Now after cold treating for 2 hours at -120° F. in a Deepfreeze,

the average life of these cutters is 24 hours per grind.

FORM TOOLS—Tool life of a form cutter before cold treating was 150 pieces while after treating for 2 hours in a Deepfreeze the tool averaged 510 pieces per grind.

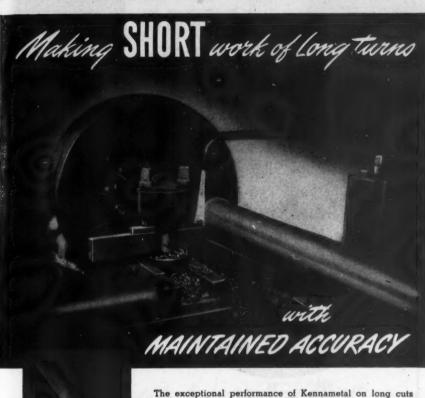
BROACHES—After cold treating high speed burnishing broaches at -120° F. for 3 hours, an increase of from 216 to 648 pieces per grind was obtained.

MORE PROOF—For additional proof on how the Deepfreeze Industrial Chilling Machines can be profitably adapted in your plant for the cold treating of cutting tools and many other applications, send for the free copy of the new Deepfreeze Metal Chilling Book.



Deepfreeze

2318 DAVIS STREET NORTH CHICAGO, ILLINOIS



The exceptional performance of Kennametal on long cuts works miracles in steel-cutting shops where taper is a bug-aboo that means, at the best, expensive reworking and finish grinding, and at the worst, a high rate of rejections. Kennametal contains a unique intermetallic compound (tungstentitanium-carbide) that gives it unmatched hardness. Used properly, it can remove stock from the toughest steel up to 3% times more effectively than other carbides!

Our engineering staff knows and understands the amazing inherent characteristics of Kennametal and how best to apply them to any specific cutting job. There is an experienced field engineer in your district ready to help you select the right grade of Kennametal, and to determine the proper tool design and the most efficient machine set-up. When these factors are nicely balanced—Kennametal breaks production records!

Get acquainted with Kennametal. Write for our descriptive Catalog 43-C that contains information on tool design, use, and maintenance.



KENNAMETAL Gro.

RIOR CEMENTED CARBIDES

ine

# Gory does in



...with Fast Accurate

Buffalo

BENDING ROLLS

Photo courtesy of Consolidated Vultee Aircraft Corp.

■ Yes, even difficult bending operations enjoy new simplicity—and the output keeps up with assembly line needs—with "Buffalo" Bending Rolls on the job. Inexperienced labor quickly gets the knack of these machines—turns out the work accurately, with a minimum of rejects. "Buffalo" Bending Rolls are adaptable to a wide range of cross-section shapes and sizes, producing rings, arcs, spirals and other circular shapes. Engineering data on request.



## **BUFFALO FORGE COMPANY**

388 Broadway

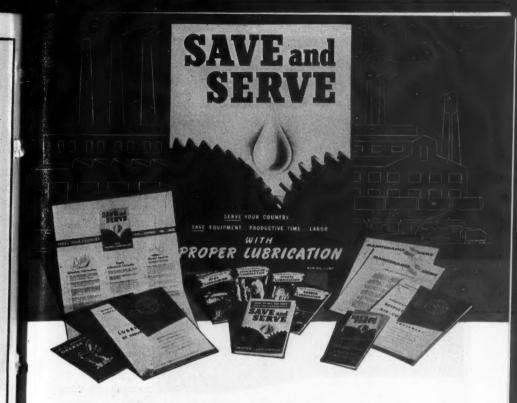
Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



BENDING ROLLS

SU



# HERE IS A "Complete Lubrication Plan" THAT WILL

#### HELP YOU SAVE EQUIPMENT... PRODUCTIVE TIME... LABOR

Your equipment must last through the war...into the conversion period...and far beyond. Breakdowns and "wear-outs" must be sidetracked with efficient maintenance—proper lubrication.

That's the purpose of this SAVE and SERVE plan . . . to place in your hands the "know-how" of proper lubrication . . . to help you establish the practice of proper lubrication throughout your plant.

This plan is practical and easy to use. It has been prepared by Sun Lubrication Engineers to give you the benefit of their broad experience. The SAVE and SERVE Plan includes plant poster, wall chart, lubrication manual, technical bulletins, performance folders and maintenance memos. It will aid every main in your plant who is concerned with the operation of machinery to make it run better and last longer.

Put Sun's SAVE and SERVE Plan to work in your planti It's yours for the asking, to help you save vital equipment... productive time... and labor. Write today for the folder which gives you the complete details... tells you how to get all of the material.

SUN OIL COMPANY · Philadelphia 3, Pa.
Spensors of the Sunoco News Voice of the Air - Lorell Thomas

SUNOCO⇒

SUN INDUSTRIAL PRODUCTS

Helping Industry Help America

Send this Compon Today!

SUR Oil COMPANY
1000 Welnut Street
Philodelphia 3, Pa.
Send folder describing your SAVE and SERVE Plan.

NAME:
TITLE:
COMPANY:
Aposess:

# WORKERS | GO Salf Supply it - this easy, simple way for less than 1 cent a man per week



At hard work on a hot day, a worker can easily throw off several quarts of sweat—sweat that robs his body of vital salt.

Salt is a balance wheel in the human body. When salt is lost, the body is dehydrated and blood thickens. The result is Heat-Fag, lassitude, inalertness. Production suffers.

Loss of body fluids causes thirst. Water without salt under these conditions, dilutes body fluids and causes heat cramps.

The easy way to replace salt sweated out is with Morton's Salt Tablets. It costs less than a cent a man per week to have them available at every drinking fountain. Physicians with America's largest manufacturing plants have the figures to show that this cuts down Heat-Fag, heat cramps, heat prostrations. Production stays up. Accidents stay down.



#### QUICK DISSOLVING (Less than 30 Seconds)

This is how a Morton Salt Tablet looks when magnified. See how soft and porous it is inside. When swallowed with a drink of water, it dissolves in less than 30 seconds.

Case of 9000, 10-grain salt tablets

Salt-Dextrose tablets, \$315 case of 9000 - - -



#### MORTON'S DISPENSERS

They deliver salt tablets, one at a time, quickly, cleanly — no waste. Sanitary, easily filled, durable.

800 Tablet size - - - - \$3.25

Order from your distributor or directly from this advertisement . . . Write for free folder.

MORTON SALT COMPANY, Chicago 4, III.



Apri

the superior replacement for cutting oils . . . .

THE DUBUS

SERVICE MEN AND WAREHOUSE

Cincinnati-Cincinnati-Ohio

60

sy, han eek

# RADIAC Mounted Points, Mounted Wheels and Internal Grinding Wheels end "guess grinding"

PRESCRIPTION FITTED and CUSTOM COM-POUNDED: Prescription Fitting is our way of prescribing the exact Radiac Mounted Point, Mounted Wheel or Internal Grinding Wheel for your work. Each "prescription" is custom-compounded, then filed—so that re-orders can be accurately and quickly duplicated. When you buy Radiac you get the right wheel—every time!





#### COMPARE ALL THESE OTHER ADVANTAGES

RADIAC MOUNTED POINTS AND MOUNTED WHEELS. All wheels and points are dressed and finished ready to use. • All are 100% tested to precision tolerances. • Concentricity is guaranteed. • Special Bakelite cement secures wheel to mandrel. • Available in tough, regular aluminum oxide (brown) or in special aluminum oxide (white or red bond) for greater friability.

RADIAC INTERNAL GRINDING WHEELS. All wheels are 100% lested to precision tolerances. Radiac internal Grinding Wheels are available in tough, regular aluminum oxide (brown), in special aluminum oxide (white or red bond) or a special exclusive "Blue Glass" friable-bond which permits an increase in the ratio of cutting grain to bond.

PIONEERS
In the development of mountin the development of wheels,
ed points, mounted
and internal grinding wheels.

RadiacPOR-OS-WAY—RadiacPARAFLEX
—Radiac Mounted Points and Mounted
Wheels—Radiac Internal Grinding
Wheels—Radiac Abrasive Cut-Off
Machines and Discs.

For Fast Stock Removal, Long Life, Cool Cutting—

RADIAC

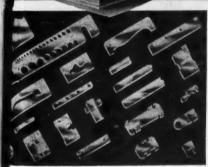
A. P. DE SANNO & SON, ÎNC., 440 Wheatland Street, Phoenixville, Penna., Since 1893
NEW YORK • PITISBURGH • CLIVELAND • DETROIT • CHICAGO • LOS ANGELES

T. M. Reg. U. S. Pat. Off.

386

Copyright, 1944, A. P. de Sanno & Son, Inc.

ACCURATE TO A THOUSANDTH
HIGH GRADE, ANNEALED TOOL STEEL
INDIVIDUALLY PACKED, WITH DIMENSIONS CLEARLY MARKED



It comes in a variety of widths, 18 inches long, thicknesses by sixty-fourths to an inch or more.

It is convenient, time-saving, economical for making templates, test tools, gages, parallels, machine parts, jigs and fixtures, dies and cutters.

It is of Starrett quality and dependability.

Write for Ground Flat Stock Folder and Chart MD.



THE L. S. STARRETT CO-ATHOL-MASSACHUSETTS · U. S. A.

World's Greatest Toolmakers

Now, with Service Star

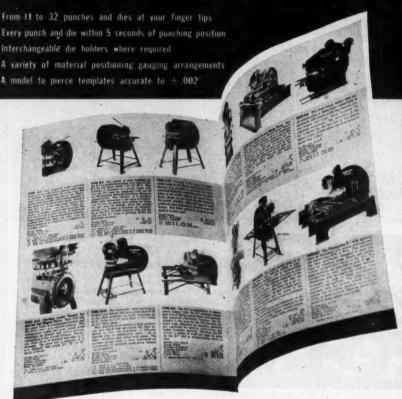
# STARRETT

PRECISION TOOLS . DIAL INDICATORS . GROUND FLAT STOCK HACKSAWS . METAL CUTTING BANDSAWS . STEEL TAPES

0

# A WIEDEMANN TURRET PUNCH PRESS for EVERY SHORT RUN PIERCING JOB

SAVINGS IN TIME AND LABOR UP TO 500%



Bulletin 101 describes the complete line of Wiedemann Turret Punch Presses from hand operated utility models to 80 ton specialized production machines with gauge tables which save up to 80% on layout and piercing time.



WIEDEMANN MACHINE COMPANY

1821 SEDGLEY AVENUE, PHILADELPHIA 32, PENNSYLVANIA

WIEDEMANN TURRET PUNCH PRESSES & CARLES

# For Holding Grinding Work

Magne-Blox laminated parallels and V-Blocks can be furnished in special sizes and forms to hold various types of work for surface grinding that may now require complicated clamps and holding devices. With Magne-Blox, you simply set the work in place and proceed with the grinding. Investigate.

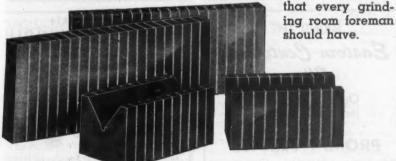


### MAGNE-BLOX SETS FOR IMMEDIATE DELIVERY

Now available for immediate delivery are our standard Magne-Blox Parallels and V-Blocks in the following sizes. They will quickly save their cost by simplifying difficult set-ups.

Set	large	Magne	-Blox	Parallels,	, 1"	×	3"	×	73/	"			 	\$29.50
Mat	ched	double	pair o	f above	(4	ole	ces	) .						\$59.00
				. 13/4" X										

Write today for our new 8-page folder entitled "Time Saving Devices for the Grinding Room." This pamphlet contains information



GEORGE SCHERR COMPANY, Inc.

130 LAFAYETTE STREET NEW YORK 13, N. Y.

# SERVICES DIRECTORY

GRINDING • STAMPINGS • TOOL and DIE WORK MACHINE WORK • CASTINGS • HEAT-TREATING FORGINGS • EMPLOYMENT • BUSINESS • ETC.

### PATTERNS

Wood and Metal — also Match Plates. For all kinds of castings—large or small. Estimates on Request.

GENERAL PATTERN WORKS
2231 Buck St., North of Harrison Ave.
Phone MAin 4751
Cincinnati, Ohio

#### AUTOMATIC AND HAND SCREW MACHINE PRODUCTS

... up to 2" diameter — any material — small or large quantities. Prompt service.

IMSANDE SCREW PRODUCTS CO. 3517 Cardiff Ave., Oakley, Cincinnati, Ohio

#### CENTERLESS GRINDING

**SINCE 1925** 

CINCINNATI

ICE PICK & TONG MFG. CO.

118 BURROWS ST. . CINCINNATI, O.

#### GRIND THE

## Eastern Centerless Way

Our new plant with increased facilities assures

#### PROMPT SERVICE

Eastern Centerless Grinding Co.

470 Tolland St. East Hartford, Conn.

# PRECISION GROUND GEARS CAMS THREADS SPLINES

Excellent facilities for grinding gears, cams, threads and splines on a contract basis.

SEND BLUEPRINTS FOR ESTIMATE

# HARTFORD SPECIAL MACHINERY COMPANY

Hartford, Conn.

#### CENTERLESS GRINDING

Straight, Cylindrical, Shoulder, Profile, and Multiple Diameters . . Ground Taper Plus Screw Machine Products. Heat treated and ground if necessary. Improved and expanded facilities insure prompt and accurate service. Send blueprints or samples for estimates.

PORTER MACHINE CO. 3139 Enyart Ave., Oakley, Cincinnati, Ohio

#### A COMPLETE

## PRECISION GRINDING

SERVICE

CENTERLESS GRINDING INTERNAL CYLINDRICAL GRINDING

EXTERNAL CYLINDRICAL GRINDING BLANCHARD SURFACE GRINDING

PLAIN SURFACE GRINDING THREAD GRINDING

Send Blueprint Sketch or Samples for Quotation



# MANUFACTURING CORP.

1235 E. Erie Avenue Philadelphia, Pa.

MODERN MACHINE SHOP

April, 1944

30

BA

Pre

20

Spe

rela

(Mc

WA

A

COL

Too

line

det

OXI

# Hand Screw Machine Products UP TO 3" BAR OR CHUCK. PRODUCTION MILLING ON DUPLICATE MACHINE PARTS. GAUGES, JIGGS, FIXTRES AND SPECIAL MACHINES.

BEAVER MACHINE & TOOL CO.

From Simplest to Most Exacting
Jigs, Gauges, Tools, Fixtures.
Designing and Engineering.
Light Manufacturing.
Thirty Years of Service.

SCHMIDGALL MFG. CO.

307 Cass St.

ID

ES

ing

L

Y

Pins

and

ded

vice.

Ohio

tion

1944

15.

Peoria 2, III.

#### PATENTS AND TRADE-MARKS

Patent and profit by your inventions. Protect your most valuable assets. Expert personal service.

LESTER L. SARGENT
Registered Patent Attorney
P. O. Box 3156
Washington, D. C.

#### **BAKELITE SILENT GEAR SERVICE**

ALL SIZE BLANKS IN STOCK.

Teeth Cut To Your Specifications.

Prompt Delivery. Write for quotation.

GREAVES MACHINE TOOL COMPANY
2009 Eastern Avenue Cincinnati, Ohio

#### PRECISION FORM GRINDING

Specialists in grinding Circular and Flat FORM-TOOLS, FORM Counterbores, FORM Flat-Drills, and related types of FORM grinding. Also step-grinding of Tungsten and Molybdenum Rods.

Send Prints for Quotation and Delivery

J. & S. TOOL CO., 477 Main St., E. Orange 5, N. J. (Makers of J. & S. Radii and Angle Dressing Tools)

#### WANTED: MANUFACTURERS' REPRESENTATIVE

A number of territories open to sell on commission basis outstanding Machine Tool Accessory line also a Flexible Coupling of exceptional merit. Write giving full details as to present connections and past experiences. All correspondence kept confidential. Write Box 42, Modern Machine Shop, 431 Main St., Cincinnati 2, Ohio.

#### WANTED

Tool Engineer to sell several lines of precision cutting tools in Metropolitan New York with well established firm; suitable guarantee and commission basis; must have experience in use or sale of such tools. Address Box 43, Modern Machine Shop, 431 Main St., Cincinnati 2, Ohio.

#### CENTERLESS

GRINDING
LATHE WORK

Send Blueprint for Quotations
FOULK ENGINEERING CO.
4208 Airport Road Cincinnati, Ohio

### STAMPINGS

Capacity available for high speed production of small stampings.

AMERICAN METAL WORKS, Inc. 1501 Germantown Ave., Philadelphia 22, Pa.

#### Government Material For Sale

Raw and fabricated materials, standard parts, motors, hardware, fabrics, precision tools, equipment, and other surplus stocks are being offered for sale by the Army Air Forces.

Companies interested in such materials, and who are desirous of having their names placed on the active bidders list, are invited to write to the Army Air Forces, Materiel Command, Midcentral Procurement District, 111 West Jackson Boulevard, Chicago 4, Illinois, Attention: Redistribution & Salvage Section.

Standard Gages. Standard Gage Co., Inc., Poughkeepsie, N. Y., is now issuing a 20-page catalog containing illustrations, descriptions, specifications, and price tables regarding dial indicators, dial bore gages, dial snap gages, dial comparators, adjustable limit s nap gages, plug and ring gages, and master discs. The chrome plating service for gages which is offered by the company is also explained in the catalog. Copy free upon request.



# WHERE TO GET IT

Gage Gage Gage Gash Gear

Gear Gear Gear Gear Gear Gear

Great Grin Grin Grin Grin Grin

Grin Grin Grin Grin Grin Grin Grin Grin

Grin Grin Grin Grin

Gun Ham Ham

Hand

Hand Hard Hing Hob

Hobs Hois Hold Hold Hold Hold

Hole Hon

Hose Hyd

Indicate Ind

ligs Keyv Knee

Kniv Knol

Apri

Abrasive Cloth, Paper, Discs, Belts, Stones, Etc., 199, 211, 59, 72, 82, 39 Absorbents, Oil and Grease, 97 Air-Operated Equipment (Look for specific item) Alloys, 110, 113, 60, 348 Angles, 102, 95 Arbors, 137

Rations, 137

Backstands, 328
Balancing Kits, 178
Balancing Mits, 178
Balancing Machines, 144, 165, 7
Balancing Ways, 303
Bases, Machine, 331
Bearings, Ball, First Cover
Bearings, Oilless, 252
Bearings, Colless, 252
Bearings, Baller, First Cover, 1, 62, 312
Bearings, Baller, 184
Bearings, Baller, 242
Bearings, Sleeve, 183, 285
Belt Lacing Equipment, 342
Beanchs, Work, 330
Bench Legs, 327
Bending Devices, 46
Bending Machines, 246
Bending Rolls, 382
Bins, 276
Boring Bar Inserts, 297
Boring Bar Inserts, 297
Boring Bar Inserts, 297
Boring Bars, 194, 318
Boring Machines, 297
Boring Mills, Horizontal, 42, 43
Boring Mills, Horizontal, 42, 43
Boring Mills, Vertical, 4
Boxes, Shop, 296, 80, 313, 327
Brakes, Press and Bending, 135, 46, 335
Broaching Fixtures, 157, 243
Broaching Fixtures, 157, 243
Broaching Machines, 80, 9, 157, 243
Buffing Machines, 404
Burring Machines, 307
Bushings, Drill Jig, 200, 255, 311
Carbides, 120, 48, 49, 58, 381

Carbides, 120, 48, 49, 58, 381
Castings, 303, 348
Centers, Lathe, Planer, Miller, Etc., 155, 166, 238, 241, 273, 399
Centrifuges, 25
Chilling Equipment, Industrial, 380
Chisels, 172
Chucking Machines, Automatic, 25
Chucks, Collet, 33, 194, 67, 90, 91, 309
Chucks, Drill, 298
Chucks, Drill, 298
Chucks, Grinding Segment, 70, 71
Chucks, Lathe, Second Cover, 63, 379
Chucks, Magnetic, 182, 230, 69, 305, 378
Chucks, Tap, 305, 20, 357, 327
Clamps, 282, 37, 316, 368
Clinching Machines, 205
Clutches, 329, 356
Collet Closers, 271, 354
Collets, 33, 67, 90, 91, 27, 56
Comparators, 16

Compressors. Air. 207, 38
Controlling Devices. 69
Coclants. 69, 385
Coclant Units and Systems. 69, 305, 26, 57
Counterbores. 166, 209, 59, 337
Counters. 270, 79
Countersinks. 367
Couplings. Flexible. 198, 250, 5, 327
Cross Slides. 271, 67
Cut-Off Machines. 233, 75, 365, 340
Cutters. Bar. Rod. Etc., Hand. 274
Cutters. Flue Sheet. 337
Cutters. Milling. 145, 149, 159, 187, 194, 205, 209, 214, 219, 261, 267, 283, 104, 105, 79, 316, 360, 381
Cutters. Rotary. 371 Cutters, Rotary, 371 Cutters, Shaper, 149 Cylinders, Hydraulic and Pneumatic, Second Cover, 169, 205, 263 Demagnetizers, 230, 241, 305, 378
Diamonds and Diamond Tools, 163, 224, 279, 286, 361, 326, 332, 337, 342, 352
Diamond Wheels, 223, 286
Die Heads, Threading, 233, 2, 16, 25
Die Making Machines, 99, 3
Dies, 256, 105, 307
Dies, 258, 105, 307
Die Sets, 231, 301, 318
Dividing Heads, 265, 68
Dogs, Lathe, Grinder and Miller, 37
Drawbars, 67
Dressing Fixtures, Grinding Wheel, 265, 339, 345 Dressing Tools. 158, 163, 224, 279, 286, 361, 326, 332, 337, 342, 352
Drill Heads, 329, 339
Drilling Machines. Bench. 179, 269, 106, 22, 26. Drilling Machines, Multiple Spindle, 253, 269, 22, 365 22, 365
Drilling Machines, Radial, 133, 143, 365
Drilling Machines, Unit Type, 280
Drilling Machines, Vertical, 253, 269, 306, 22, 365
Drills, Center, Core, Twist, Square, Etc., 166, 187, 197, 209, 274, 105, 74, 79, 337
Drills, Portable Electric, 351, 404, 395
Drills, Portable Pneumatic, 207
Drives, Motor, 215, 260, 314, 338, 345
Duplicating Machines, 41, 315
Dust Control Equipment, 179, 404, 100, 112, 69, 44, 362 44, 362 Engraving Machines, 315, 41 Etchers, 315

Facing Heads, 308, 42, 43 Feed Fingers, 56 Files, 141, 73, 343, 367, 375, 394 Files, Band, 69

Files, Band, 59 Files, Rotary, 33, 249, 98, 367, 317 Filing Machines, 149, 69 Filters, 195, 100, 362 Flexible Shaft Equipment, 33, 161, 235, 86, 365 Foundry Riddles, 68 Furnaces, Heat-Treating, 301, 333, 24

Lapping Machines. 8, 9
Lathes. Automatic, 165, 7, Third Cover, 16, 23
Lathes. Bench, 142, 147, Third Cover, 106, 26, 400
Lathes. Engine and Toolroom, 143, 147, 245, 272, 274, 280, Third Cover, 109, 92, 64, 47, 400, 350
Lathes. Polishing, 215, 365
Lathes. Speed, 290, 36
Lathes. Turret, 147, 245, 165, 7, 16, 53
Lathes. Vertical Turret, 204, 19
Lathe Units. Collet Head, 240
Layout Materials, 180 Gage Blocks, 108, 69, 370, 377 Gage Blocks, 108, 69, 370, 377
Gage Handles, 173
Gages, 131, 159, 201, 217, 221, 225, 237, 244, 265, 294, 65, 93, 312, 369, 370, 317, 325
Gaskets, 304
Gear Cutting Machines, 11
Gear Finishing Machines, 363
Gear Measuring Machines, 149
Gear Measuring Machines, 149
Gear Measuring Machines, 149
Gear Measuring Machines, 149
Gear Measuring Machines, 265, 268, 298, 5, 325, 337, 346 Lathes, Vertical Turret, 204, 19
Lathe Units, Collet Head, 240
Layout Materials, 180
Levers, 288, 323
Levers, Hand, 102
Levers, Hand, 102
Levers, Pull-Feed, 68
Lighting Equipment, 244
Locating Tools, Optical, 17
Lubricants, 385, 383, 346
Mallets, Rawhide, 322
Mandrels, Expanding, Second Cover, 226
Markers, Roll, 307
Marking Machines, 114, 192, 222
Metallizing Equipment, 347
Micrometers, 299, 312, 387
Micrometers, 299, 312, 387
Micrometers, 299, 312, 387
Micrometers, 299, 312, 387
Milling Machines, Hotalments, 94, 17, 319
Milling Machines, Bench, 106, 68, 26
Milling Machines, Bench, 106, 68, 26
Milling Machines, Hand, 210, 61
Milling Machines, Horizontal, 8, 9, 283, 289, 68
Milling Machines, Horizontal, 8, 9, 283, 289, 68
Milling Machines, Universal, 8, 9, 283, 10, 41, 342
Millis, End, 104, 105, 166, 79, 59, 360, 372
Mills, End, 104, 105, 166, 79, 59, 360, 372
Mills, End, 104, 105, 166, 79, 59, 360, 372
Mills, Lellow, 165, 218, 261
Motors, 118, 215, 50, 365 05, 209, 6, 360, econd , 279, , 339, 1, 326, 22, 26, , 269, 2, 365 2, 69,

365

1944

7

Pumps, Hydraulic, 189 Punches, 256, 266 Punch Press Feeds, 231, 326 Pyrometers, 238

Racks, Bar and Tube, 284 Reamers, 105, 187, 194, 197, 209, 259, 166, 251, 74, 79, 59 Reamers, Portable Pneumatic, 207 Recorders, 270 Regulators, 195

Resurfacing Materials, Floor, 292 Rhecstats, 282 Riveting Machines, 205, 335 Rivet Injecting Devices, 85 Rivets, 186

Rivets, 186

Safety Equipment, Press, 188, 333
Salt Tablets, 384
Sanders, Portable Electric, 395
Sanding Machines, 68, 269
Saw Blades, Band, 69, 84, 191, 228, 387, 317
Saw Blades, Circular, 105, 254
Saw Blades, Circular, 105, 254
Saw Blades, Hack, 84, 190, 191, 228, 313, 343, 373, 387, 317
Saw Frames, Hack, 317
Saw Frames, Hack, 317
Saw Guides, Band, 319
Sawing Machines, Band, 99, 69, 269, 365, 331
Sawing Machines, Hack, 66, 189, 6, 348
Saw Sharpening Machines, 170, 146, 307
Sawas, Portable Electric, 395
Scrapers, Hand, 216
Screw Drivers, Portable Electric, 395
Scrapers, Hand, 216
Screw Drivers, Portable Electric, 395
Screw Drivers, Portable Pneumatic, 207
Screw Drivers, Portable Pneumatic, 207
Screw Drivers, Portable Pneumatic, 25
Screw Machines, Automatic, 25
Screws, Cap, Set, Socket and Machine, 151, 186, 231, Fourth Cover, 45, 325
Screws, Self-Tapping, 151
Screws, Thumb, 37
Screws, Transfer, 220
Second-Operation Machines, 136
Services; Milling, Grinding, Lapping, Rebuilding, Repairing, Business, Etc., 221, 264, 298, 390, 391, 307, 369, 371, 376, 324, 325
Shaper-Planers, 101
Shapers, 101, 106, 119, 283, 135, 143, 269, 303, 26
Shearng, Machines, 135, 376, 334
Shears, Bench, 266, 46, 319
Shears, Portable Electric, 171
Shims, 304
Sine Bars, 265
Sleeves, 79

Snims, 304 Sine Bars, 265 Sleeves, 79 Slotting Machines, 101 Sockets, 172, 152, 237, 37 Solenoids, 25 Solenoids, 25 Spacing Collars, Arbor, 304

Special Machinery, 262, 165, 7 Speed Reducers, 337 Spindles, 65 Spline and Index Fixtures, 265 Spot Facers, 166, 337 Springs, 231 Sprockets, 337 Sprockets, 337
Squares, 102
Stamps, 159, 307, 329, 333, 341, 344
Steel. Cutting, 83, 229
Steel, General Purpose, 83
Steel, Sheet, 83
Steel, Stainless, 83
Steel, Stainless, 83
Steel Stock, Ground Flat, 387
Steals, 330

Stools, 330
Stops, Lathe, 34, 354
Straightedges, 102, 95
Surfacing Machines, Abrasive, 365, 320
Switches, 25

Tables, Rotary and Index. 102, 295, 299
Tachometers, 241
Tapes, Measuring, 387
Tap Extractors, 323
Tappers, Portable Electric, 395
Tappers, Portable Pneumatic, 207
Tapping Attachments, 33, 269, 305, 20, 357
Tapping Machines, 233, 280, 18, 19, 357
Taps, 105, 72, 175, 181, 221, 288, 153, 159, 297, 309, 15
Taps Collapsible, 175, 233, 2, 25
Threading Machines, 2, 233, 18, 19, 28
Timers, 270

Threading Machines, 2, 233, 18, 19, 28
Timers, 270
Tool Attachments, Angle, 164
Tool Bits, 120, 74, 181, 166, 48, 49, 58, 381
Tools, Boring, 104, 194, 166, 156, 318
Tools, Chamiering, 344
Tools, Facing, 156
Tools, Facing, 156
Tools, Form, 79, 221, 149
Tools, Gear Cutting, 105, 261
Tools, Gear Cutting, 105, 261
Tools, Roller Turning, 156
Tools, Roller Turning, 156
Tools, Special Cutting, 74, 76, 79, 174, 181, 194, 209, 219, 166, 145, 149, 372, 337
Transformers, 50
Trucks, 331

Trucks, 331

Tumbling Machines, 374
Turrets, Lathe, 68, 194, 236, 287, 271, 303

Valves, Second Cover, 189, 242, 263, 51, 310, 353 Vises, Bench and Machine, 68, 195, 231, 265, 37, 40, 314, 336, 341, 352, 346 Welding Equipment and Supplies, 83, 193, 154 341, 354 Wire Stripping Machines, 321 Wrenches, 172, 152, 237, 281, 257, 37

Genuine Grobet Precision Swiss Files are world famous for utmost precision and durability since 1812. Learn more about these chrome steel files—send for Cata-

log KF, the most complete of its kind.

5000 SHAPES and SIZES FOR EVERY PURPOSE GROBET FILE CO. of AMERICA 421 CANAL ST., NEW YORK 13, N. Y. Wr

det line

Ele dri

tap

ber alo

April,



# PORTABLE ELECTRIC TOOLS

Greater power combined with speed gives you faster, better performance with Thor Portable Electric Tools that sees scores of jobs through quickly.

Thor combines balanced motor design with lightweight construction to provide this greater power and faster, easier handling.

The Thor motor, producing true, smooth-running power because it is balanced both statically and dynamically as a complete assembly, is ruggedly built to stand up...longer, under the toughest operations.

Thor housings of strongly reinforced aluminum alloys and, in late drill models, of durable "Thorite" plastic, are compactly built to reduce weight to an absolute minimum without sacrifice of motor size and capacity, providing the light weight and handling ease that adds speed to power to get jobs done faster.

Write today for more details of the complete line of Thor Portable Electric drills, screw-drivers, nut setters, toppers, grinders, samders, polishers, sams and bench grinders in Catalog No. 38.



Portable Electric Tools

INDEPENDENT PNEUMATIC TOOL COMPANY



100 W. JACKSON BOULEVARD, CHICAGO, ILL.

Branches in Principal Cities

297.

94,

P.F.C. JOE PALOOKA SAYS:

by HAM FISHER

I REMEMBER A GUY ONCE ... I HAD 'IM ON THE ROPE'S AN' HE DROPPED 'IS GUARD... I FIGURED HE WAS LICKED, SO I STEPPED BACK... THEN HE LET ME HAVE ONE THAT ALMOST PUT ME DOWN FOR THE COUNT. THAT'S WHAT THOSE GUYS MEAN





READING TAP GRINDER can be used on tool and cutter grinders—syrace grinders—even bench lathes. Taps sharpened after center is destroyed. No ecilets. Complete. No extras. Writel

Broach Keyseater
The Reading Bench Machine does not require thine does not require

NEW
READING
TAP
GRINDER
Prompt delivery!

bushings or guides. Very fast capacity from % to % cutter. Low first cost.

READING MACHINE COMPANY READING (CINCINNATI), OHIO



396 MODERN MACHINE SHOP

April, 1944

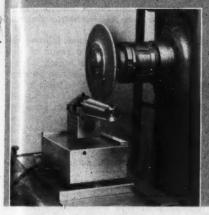
fa m an er de ac is

M

ci

Ap

# GET Jast Accurate angular set-ups





# FOR GRINDING The MAGNA SINE

FOR INSPECTION
The Robbins SINE PLATE

The Magna Sine provides the fastest and most accurate way of making both single and double angle angular grinding set-ups. It employs the sine block method of determining the angle, the most accurate method known. The part is held firmly, but without distortion, at the turn of a switch. The Magna Sine is sturdily built to precision limits and will provide years of trouble free service. Available

in two sizes in both single and double angle models.

The Robbins Sine Plate is a nonmagnetic counterpart of the Magna Sine. It is built with the same care and accuracy as the Magna Sine. Inspection set-ups can be made in a matter of seconds.

The Sine Plate is also useful for making angular set-ups for jig boring. It is available in the same sizes and models as the Magna Sine.

# ROBBINS ENGINEERING COMPANY

219 MIDI AND AVENUE

DETROIT, MICHIGAN

# The Last Word . . .

THE primary concern of all of us is, of course, the winning of the war. But wherever businessmen gather, one single thought dominates the conversation: "What is going to happen to business after the war." And it's a good question, because good business means employment, employment means buying power, and buying power means prosperity. By the same token, poor business conditions mean unemployment, and unemployment means poverty and bread-lines. So it is well to begin planning now for the future.

If history repeats itself, we will have a couple of years of good business, followed by a buyers' strike against the high prices that are sure to prevail as a result of high wages, and finally a fear of depression which will, itself, bring on that which it fears. And if that happens, what will be the next move? Will American businessmen be smart enough to whip the situation this time, or will the government have to step in and

supply employment again in the form of another WPA?

America has, for a century and a half, been advertised to the world in song and story as a land of freedom. The individual has been free; our industries have been see; our institutions have been free. Every American has enjoyed the privilege of engaging in any legitimate enterprise that he chose as a means of livelihood. Under this yetem of free enterprise America has grown to be the greatest industrial nation on Eoth. Now we are approaching a crossroad, and upon the decisions that are

made may depend the future progress of America.

All of Agerican industry has, for the past two years, been engaged in a single huge task—the task of out-producing the enemy. To accomplish this task, America's workshops have been integrated under a single management—the War Department. But when the need by munitions has passed, if America is to continue as the world's most progressive nation. American industries must be able to take up where they left off. Any idea of continuing under government restrictions and supervision is an impractical, Marxian dream. And yet the proposal has been made that the national economy be controlled by Government bureaus.

Quoting some figures given by DeWitt Emery before the United States Junior Cham-

ber of Commerce, let us see how Government control works.

The Government set up the A.A.A. to "save" the farmer, in which an overall plan was devised to replace the haphazard method whereby each farmer determined for himself what he would raise, and how much. Prices were to be raised and the farmers' income increased. Over a period of five years several billion dollars of the taxpayers' money was poured into the farm program. Here are some figures from the result:

The average price of wheat, 1921 through 1932, before A.A.A., was \$1.017 per bushel. The average price from 1933 through 1937, during A.A.A., was 85½ cents a bushel—a decline of 16.2 per cent. During the same period corn declined 4.3 per cent, cotton 34.7 per cent, cattle 17.1 per cent, hogs 15.9 per cent, and potatoes 26.9 per cent. That

was planned economy.

During the period from 1933 through 1937, little pigs were slaughtered, crops were ploughed under, and bounties were paid out of the public treasury for not raising crops. And what was the result? In 1933 we imported 6,470 pounds of hogs; in 1937 we imported 16,555,218 pounds of hogs. In 1933 we imported 74,658 head of cattle; in 1937 we imported 494,945 head. In 1933 we imported 160,288 bushels of corn; in 1937 we imported 86,337,248 bushels. In 1937 approximately 30 million acres were held out of production, of which, if our food requirements had been produced at home, approximately 25 million acres would have been cultivated.

That is the record for five years of planned economy as applied to agriculture, taken from the official records of the Department of Agriculture. If that is any criterion, Government control of the national economy would plunge us into a permanent

depression. God forbid!

Howard Campbee

erever hat is good power ment,

ed by high fears. smart a and

been ge of Inder ation t are

huge vork-But most it off. ractinomy

plan d for ners'

shel. l—a 34.7 That

yere sing 1937 ; in 1937

ken ion,

out



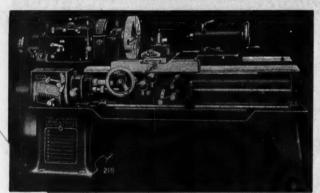


# CINCINNATI GUICK-CHANGE GEARED-HEAD MOTOR-DRIVEN

QUICK-CHANGE MOTOR-DRIVEN

# LATHES

#### Guaranteed for Workmanship, Materials and Performance



Latest catalog contains detailed specifications on 14", 16", 18", 20", 22", 24", 27" and 30" sizes. With them are obtainable 32 to 96 changes of thread and feed: 12 to 24 spindle speeds by simply shifting the lever to cover every shop requirement. Whether in tool room or manufacturing plants. CINCINNATI LATHES give most remarkable performance.

Abe

Acm

Acm Acr

Adv

Adv

Age

Alce

Alli

Alm

Am Am

Am Am

Am

Am Am Am Am Am Am Am

And Arg Arn

Arn Art Atk Atk Au Au Au Ave Bal

Bai Bat

Bai

Ap

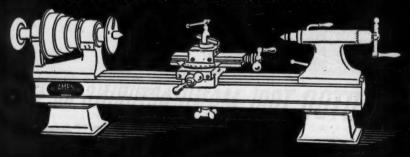
Designed and produced by specialists since 1906.

THE CINCINNATI LATHE & TOOL CO. MARBURG AVENUE. OAKLEY, CINCINNATI, OHIO

# AMES Precision BENCH LATHE

Known for 40 years as a precision lathe of the highest quality. Bed 36" long. Ball bearing headstock uses 1" capacity collets. Swing 838" over bed. Available with motor drive.

B. C. AMES CO., WALTHAM, MASS., U.S.A.





Abart Gear & Machine Co3
Aber Engineering Works Inc2
Abrasive Machine Tool Co
Ace Manufacturing Corporation
Acme Industrial Co20
Acme Machine Tool Co
Abart Gear & Machine Co.   3
Acromark Co., The
Advance Machine Works2
Advance Tool & Die Co26
Aget-Detroit Manufacturing Co
Air Reduction Sales Co1
Air-Way Pump & Equipment Co30
Alco Tool Co36
Allied Products Corporation
All-Steel Equipment Co31
Almond Manufacturing Co., T. R29
American Air Filter Co38
American Chain & Cable Co., Inc.,
Andrew C. Campbell Div
American Cutter & Eng. Corp
American Emery Wheel Works
American Metal Works, Inc
Advance Machine Works         28           Advance Tool & Die Co.         26           Aget-Detroit Manufacturing Co.         16           Air Reduction Sales Co.         11           Air-Way Fump & Equipment Co.         3           Alloc Tool Co.         3           Allied Products Corporation         22           All-Steel Equipment Co.         3           Almond Manufacturing Co.         7           American Air Filter Co.         3           American Chain & Cable Co.         10.           American Cutter & Eng. Corp.         7           American Emery Wheel Works         2           American Pipe Bending Machine Co., Inc.         24           American Sylve Works         2           American Sw & Mfg. Co.         22           American Screw Co.         15
American Saw & Mig. Co22
American Screw Co
American Swiss File & Tool Co
Amerian Tool Works Co
Ames Co., B. C
Ampeo Metal, Inc
Anderson Bros. Mig. Co
Archer & Smith, Ltd
Arguto Oilless Bearing Co
Armstrong-Blum Mig. Co
Armstrong-Bray & Co342, 34
Armstrong-Blum Mfg. Co.  Armstrong-Bray & Co.  Armstrong-Bray & Co.  342, 34  Arter Grinding Machine Co.  23
After Grinding Machine Co
Atkins & Co., E. C.       37         Atlas Press Co.       26, 10
Auto Engraver Co
Automatic Machine & Tool Co
Auto Moulding & Mfg Co
Avey Drilling Machine Co. 9
Raker Brothers Inc 30
Parman Co. Too. W. O.
Bartelt Engineering Co
Atto Engraver Co
Bartelt Engineering Co
Barriel Co., Inc., W
Barries Co., Inc., w
Barriels Co.         10.         3.           Bartelt Engineering Co.         29         3.           Bath & Co., Inc., John.         1           Baumbach Manufacturing Co., E. A.         30           Bear Mfg. Co., Industrial Div.         44           Behr-Manning Corporation         19           Besly & Co., Charles H.         7
Barriels Co., 10c., w
Barries Co.         10.           Bartelt Engineering Co.         28           Bath & Co.         1nc.         John.         1           Baumbach Manufacturing Co.         E. A.         30           Bear Mfg.         Co.         Industrial Div.         14           Behr-Manning Corporation         19         Besly & Co.         Charles H.         7           Beverly Shear Co.         31         Bicknell-Thomas Co.         33
Baumbach Manufacturing Co., E. A
Baumbach Manufacturing Co., E. A.   30
Baumbach Manufacturing Co., E. A
Baumbach Manufacturing Co., E. A.   30

Dabon Cor, or Cristian 1990
Calder Manufacturing Co224
Carboloy Co., Inc.         120           Carborundum Co., The         211           Carroll-Jamieson Machine Tool Co.         274
Carroll-Jamieson Machine Tool Co274
Carrier James of Machine 1 of Co.       247         Catskill Metai Works, Inc.       340         Central Screw Company       151         Cerro de Pasco Copper Corporation       110         Challenge Machinery Co., The       227         Champion Diamond Co.       326         Chardier Reducts Corp.       151
Central Screw Company
Cerro de Pasco Copper Corporation110
Champion Diamond Co. The
Chandler Products Corp
Chandler Products Corp
Chicago Fleumatic Foot Co.   201     Chicago Rawhide Mfg. Co.   322     Chicago Tool & Engineering Co.   346     Chicago Wheel & Mfg. Co.   54, 55     Cincinnati Bickford Tool Co.   133     Cincinnati Electrical Tool Co.   404     Chicago Martin Cont. Co.   404     Co.   404     Co.   404     Co.   405     Co.   406     Co.   406     Co.   406     Co.   406     Co.   407     Co.   407     Co.   407     Co.   407     Co.   408
Chicago Tool & Engineering Co346
Cincinnati Bickford Tool Co
Cincinnati Electrical Tool Co404
Cincinnati Gear Co
Cincinnati Grinders Incorporated
Cincinnati Lathe & Tool Co400
Cincinnati Milling Machine Co
Cincinnati Pianer Co.         4           Cincinnati Shaper Co.         135           Cincinnati Tool Co.         316
Cincinnati Tool Co
Colorar Tool Co., Inc.   208     Clark Co., Robert H.   386     Cleveland Pneumatic Tool Co.   85     Cleveland Twist Drill Co.   197     Cleveland Twist Drill Co., Momax Div.   229     Cleveland Twist Drill Co.   220     Colorare Manufacturing Co.   220     Colorare Manufacturing Co.   234     Colorare Manufacturing Co.   248     Colorare
Sleveland Preumatic Tool Co
Pleveland Twist Drill Co. Momay Div 229
Cleveland Wire Spring Co296
Colborne Manufacturing Co290
Colonial Broach Co
Colonial Bushings, Inc
Commercial Centerless Grinding Co264
Continental Screw Co151
Corbin Screw Corp., The
Cortland Grinding Wheels Corp
Yovel Manufacturing Co
20mtor Co., The   3300
Cross Company, The349
ullen-Friestedt Co
Number Co. M. F. 244
Surtis Preumatic Machinery Co
Juliman Wheel Co.       337         Junningham Co.       M. E.       344         Jurtis Pneumatic Machinery Co.       38         Jushman Chuck Co.       379
Dakon Tool & Machine Co273
Dalzen Tool & Mfg. Co 81
Dalzen Tool & Mfg. Co
Dearborn Gage Co.       377         De Sanno & Son, Inc., A. P.       386         Desmond-Stephan Mfg. Co.       382         Desmond-Stephan Mfg. Co.       382
Desmond-Stephan Mfg Co
10   10   10   10   10   10   10   10
Detroit Power Screwdriver Co315
Detroit Tap & Tool Co267
Diamond Saw Works. Inc
Dickermen Mfg Co. H. E
10   10   10   10   10   10   10   10
Dixon Crucible Co., Joseph346
Ookil Co., The
Dorman Machinery Co. Inc. 290
Ordia & Krumn Manufacturing Co335
Ou Bois Co., The
Ou Bois Co., The

Burke Machine Tool Co......

1944

om cre
to 96,
and and
spindle
y shiftcoverequirein tool
struring
NNATI
post renance.

НІО

Dykem Co., The
Earlipse Aviation
Enco Manufacturing Co
Etteo Tool Co., Inc
Everede Tool Co
Farrel-Birmingham Co., Inc 5
Felker Manufacturing Co
Fellows Gear Shaper Co
Firth-Sterling Steel Co48, 49
Fischer Machine Co
Ette Tool Co., Inc
Florian Manufacturing Co
Foote-Burt Co
Forthman, Cliff J
Fordick Machine Tool Co
Gairing Tool Co
Gallmeyer & Livingston Co
Gammons-Hoaglund Co
Gear Grinding Machine Co
Gear Specialties Incorporated325
General Die-Stamping-Tool Co
General Screw Mfg. Co
Genesee Tool Co
Gidding & Lewis Machine Tool Co42. 43
Glimore & Co., F. F
Gits Brothers Mfg. Co
Sammons-Hoaglund Co.   251
Graham Mfg. Co., Inc
Gray Machine Co
Gray-Mills Co
Greenfield Tap & Die Corporation         .153           Grenby Manufacturing Co.         .111           Grob Brothers         .331           Grobet File Co. of America         .367, 394           Gwilliam Co.         .312           Hall Manufacturing Co.         .309           Hammond Machinery Builders, Inc.         .358           Hannifin Manufacturing Co.         .169           Hardinge Brothers, Inc.         .136           Harper Co., The H. M.         .151           Hartford Special Machinery Co.         .326           Haskins Co., R. G.         .161           Hassall, Incorporated, John         .186           Heald Machine Co.         .96
Grobet File Co. of America367, 394
Gwilliam Co
Hammond Machinery Builders, Inc358
Hardinge Brothers, Inc
Hartford Special Machinery Co. 236
Haskins Co., R. G
Heald Machine Co
Hedstrom Corp., Oscar W348
Heller Brothers Co
Hilliard Corporation
Hassin B. Co., R. G.       181         Hassall, Incorporated, John       186         Heald Machine Co.       96         Hedstrom Corp., Oscar W.       348         Helmann Manufacturing Co.       220         Heller Brothers Co.       73         Hilllard Corporation       356         Hjorth Lathe & Tool Co.       .142         Holo-Krome Screw Corporation. Fourth Cover         Howe & Son       .146
Humm Safety Equipment Co John188
Huron Machine Products
Holio-Kroms screw Corporation Fourth Cover
Independent Pneumatic Tool Co395
Industrial Products Suppliers304 Ingersoll Milling Machine Co
International Screw Co
J. & H. Electric Co
J. & S. Tool Co
Indestrial Products Suppliers   304     Industrial Products Suppliers   304     Ingersoll Milling Machine Co.   104     International Screw Co.   151     Invincible Tool Co.   164     J. & H. Electric Co.   305     J. & S. Tool Co.   345     Jarvis Co.   The Charles I.   33     Jarvis Co.   The Charles I.   38     Jefferson Machine Tool Co.   68
402 MODERN MACHINE SHOP

Johnson Bronze Co	
	13
Johnson Co., W. E	7
Johnson Gas Appliance Co	1
Johnson Tool Co30	9
Jones Engineering Co	8
Jones & Lamson Machine Co	6
Jurzek Machine & Eng. Co	14
Kar Engineering Co., Inc	12
Kearney & Trecker Corporation	7
Kennametal, Inc.	11
Knight Machinery Co., W. B	10
Knu-Vise Incorporated	8
L-W Chuck Co.	6
Lamson & Sessions Co., The	131
Landis Machine Co	2
Landis Tool Co	3
Lapointe Machine Tool Co	7
Leach Machinery Co., H	D
LeBlond Machine Tool Co.,	
The R. KThird Cove	Г
Lee Co., K. O	Z
Lehmann Machine Co 4	7
Leiman Bros, Inc11	Z
Lempco Products, Inc	7
Lenox Instrument Co	8
Lewis Machine Tool Co30	3
Lewthwaite Machine Co., T. H	4
Libert Machine Co	4
Liberty Tool & Gage Works27	6
Lima Electric Motor Co21	6
Lincoln Park Industries, Inc37	0
Linley Brothers Co34	2
Lipe-Rollway Corporation10	9
Littleford Bros., Inc	1
Logan Engineering Co24	.6
Logansport Machine, Incorporated,	
Second Cove	r
Lovejoy Flexible Coupling Co20	U
Lucas & Son, Inc., J. L	U
Luers, J. Milton30	8
Lynn Manufacturing Co23	6
Lyon-Raymond Corporation33	1
McCrosky Tool Corp19	4
McGill Manufacturing Co	81
M-B Products	51
McGriff Manufacturing Co.  Ma B Products Corporation	2
Machinery Manufacturing Co23	3
Madison-Kipp Corporation29	0
Majestic Tool & Mig. Co	49
Marquette Manufacturing Co34	-
Master Electric Co.,	1
	1
Industrial Equipment Div33	1 8
Industrial Equipment Div33 Master Gauge Co29	1 B
Industrial Equipment Div	8 4 4
Industrial Equipment Div	8 4 4
Industrial Equipment Div	844
Industrial Equipment Div	8441777
Industrial Equipment Div	844
Industrial Equipment Div	1 844
Industrial Equipment Div.   33	844417779992
Industrial Equipment Div	844411777799
Industrial Equipment Div.   33	84441777799
Industrial Equipment Div	844417779992591
Industrial Equipment Div	844417779925917
Industrial Equipment Div	84441777999259171
Industrial Equipment Div	1 84441777999259174
Industrial Equipment Div	1 84441777999259171
Industrial Equipment Div	1 844417779992591171
Industrial Equipment Div	8 4 4 4 1 1 7 7 7 7 9 9 9 9 9 1 1 7 7 7 4 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9

Apri

Nobur Norgre Norma Norton Numbe Oliver O'Neil Owato Paddo Parker Parker

rittsb Plomb Pope Porter Pratt Div Procus

Produ Produ Pross Putna Qualit Readi Readi Ready Reed Reich Reiff Remc Rex I Reyno Rivet Robbi Rober Dobei rocki tock Roger Roger Roger Ross Rotar Roto Rusn Russ S & Safet Sanfe Sava Sav-Schei Schm Schu Scovi Senti Servi Shak Sheld no cl ls 3kin Smit Smit Snap Sossi Sout Sout Spar

	And the Colombia State of the Colombia State	
9	Nobur Manufacturing Co	29
3	Norgren Co. Inc. C. A	12
ă	Norma-Hoffmann Bearings Corp First Cove	er
g	Norton Co202, 20	03
9	Numberall Stamp & Tool Co., Inc329, 33	33
1	Oliver Instrument Co., Inc	3
	Norton Co. 202, 22 Numberall Stamp & Tool Co., Inc. 329, 33 Oliver Instrument Co., Inc. 07 O'Neil-Irwin Manufacturing Co. 20 Owatonna Tool Co. 22 Paddock Tool Co. 33	16
ì	Owatonna Tool Co	10
2	Paddock Tool Co	13
ı	Parker Valon Comp	51
ı	vtucket Screw Co.	51
l	Owatona Tool Co.   22	31
ĥ	Il Manufacturing Co1	51
ĕ	ips Screw Manufacturersli	51
ľ	1	78
ı	Fittsburgh Stamp Co., Inc	11
ı	Plomb Tool Co	72
ı	Pope Machinery Corporation	18
ı	Porter-Cable Machine Co. 24 Pratt & Whitney, Division Niles-Bement-Pond Co. 25 Production Instrument Co. 37 Production Machine Co. 37 Producto Machine Co. 27 Producto Machine Co. 27 Prosser & Son Thomas 37	16
1	Division Niles-Rement-Pond Co. 20	15
ı	Procunier Safety Chuck Co	7
I	Production Instrument Co	70
ı	Production Machine Co	0
ı	Producto Machine Co	31
ı	Prosser & Son, Thomas	19
ı	Putnam Tool Co	59
ı	Quality Tool & Die Co	93
ı	Racine Tool & Machine Co	8
ı	Reading Machine Co	70
ı	Pendy Tool Co.	10
ı	Reed Small Tool Works	32
ı	Reich Manufacturing Co., J. R.,	10
ı	Reiff & Nestor Co	77
ı	Remco Products Corporation	10
ı	Rex Rheostat Co28	2
ı	Reynolds Machinery Co24	10
ı	Producto Machine Co.   22	7
7	Robbins Engineering Co	77
b	Rivett Lathe & Grinder Inc.  Robbins Engineering Co	9
	mockford Drilling Machine Co., W	9
A	tockford Machine Tool Co	n
ľ	Rogers Manufacturing Co., Dayton	0
ı	Rogers & Co., S. C17	0
ı	Rogers Tool Corporation, John M	9
ı	Ross Operating Valve Co	1
ı	Rotary File Co., The	B
ı	Rusnok Tool Works	0
ı	Russell Burdsall & Ward Bolt & Nut Co. 15	1
ı	Ruthman Machinery Co	2
ı	Ruthman Machinery Co.         38           S & S Machine Works.         18           Safety Grinding Wheel & Machine Co.         8           Sanford Manufacturing Co.         16           Savage Co.         J.         20           Schauer Machine Co.         3           Scherr Co.         Inc.         George.         3           Schmidt, Inc., Geo.         T.         114, 222, 30           Schultz & Anderson Co.         3         Scovill Manufacturing Co.         15           Seneca Falls Machine Co.         2         Sentry Co.         The.           Services Directory         390, 39           Severance Tool Industries, Inc.         37           Shakeproof Inc.         16           Sheffield Corporation         36	4
ı	Safety Grinding Wheel & Machine Co 8	8
ı	Sanford Manufacturing Co	8
ı	Savage Co., W. J20	18
ı	Sav-Way Industries 6	5
ı	Schauer Machine Co 3	98
ı	Schert Co., Inc., George	9
ı	Schultz & Anderson Co	4
,	Scovill Manufacturing Co	1
ı	Seneca Falls Machine Co	3
	Sentry Co., The 2	4
	Services Directory	1
	Severance Tool Industries, Inc	1
	Shakeproof Inc15	1
	Shemeld Corporation36	9
d	Sheldon Machine Co., Inc32	0
ı	clair Refining Co.	0
J	lsaw. Incorporated	i
ř	3kinner Chuck Co 4	Õ
	Smit & Sons, Inc., J. K	6
	Smith Tool & Engineering Co28	4
	Snap-On Tools Corporation23	7
	Sossner Tool & Machine Works, Inc	9
	South Bend; Lathe Works	6
	Spartan Saw Works Inc. Co., The	1
	Springfield Machine Tool Co.	2
ı	Severance Tool Industries, Inc.   37	-
	Amell 1044	

Stackbin Corporation         276           Standard Gage Co., Inc.         201           Standard Pressed Steel Co.         45, 330           Stanley Electric Tool Div.         171           Starrett Co., The L. S.         387           Steege Machinery Co., W. L.         314           Sterling Factory Equipment Co.         327           Stevens Inc., John B.         299           Stevens, Walden, Incorporated         152           Stows Industries         64           Stow Manufacturing Co., Inc.         86           Strand Manufacturing Co.         333           Strong, Carlisle & Hammond Co.         335           Sturginardic Tool Co.         155           Sturgins Products Co.         374           Sunnen Products Co.         117
Stanley Electric Tool Div
Steege Machinery Co., W. L
Stevens Inc., John B
Stokes Industries
Stow Manufacturing Co., Inc
Strong, Carlisle & Hammond Co
Sturgis Products Co
Sturgis Products Co. 374 Sunnen Products Co. 117 Sun Oil Co. 389 Super Tool Co. 380 Super Tool Co. 380
Super Tool Co
Sutton Tool Co. 56 Swanson Tool & Machine Products
Taft-Peirce Mfg. Co.       378         Tannewiz Works       39         Taylor Machine Co.       238         Thermo Electric Mfg. Co.       33         Thompson Grinder Co.       87         Timken Roller Bearing Co.       1         Tool Improvements Co.       205         Torit Manufacturing Co.       44         Triplex Machine Tool Corp.       315         Troyke, Alfred A.       295         Union Twist Drill Co.       105
Taylor Machine Co
Thompson Grinder Co
Timken Roller Bearing Co
Tool Improvements Co
Triplex Machine Tool Corp315
Union Twist Drill Co
Union Twist Drill Co., Butterfield Division
Butterfield Division
United States Steel Supply Co
United States Steel Supply Co
Utility Tool & Die Mfgrs.     271       V & O Press Co.     328       Van Keuren Co.     312       Vard, Incorporated     217       Vascoloy-Ramet Corporation     58       Victor Saw Works, Inc.     317       Vimco Manufacturing Co.     244       Vinco Corporation     265       Warner Etherite Corporation     59
Vard, Incorporated
Victor Saw Works, Inc
Vinco Manufacturing Co
Wagner Electric Corporation         50           Walker Co. Inc. O. S.         230           Walker-Turner Co., Inc.         365           Walls Sales Corporation         278           Waltham Machine Works         288           Wattham Machine Works         288
Walker-Turner Co., Inc
Waltham Machine Works268
Walton Co
Warren Industries
Watts Bros. Tool Works274
Weldex Incorporated
Weldon Tool Co
Wesson Co
Westcott Chuck Co., Inc
Western Tool & Mfg. Co
Wheel Trueing Tool Co
Whitney Chain & Manufacturing Co316
Whitney Metal Tool Co
Wiedemann Machine Co
Williams & Co., J. H
Wilson Mechanical Instrument Co239
Walker-Tunner Co., Inc.         365           Walts Bales Corporation         278           Waltham Machine Works         288           Walton Co.         323           Wardwelf Mfg. Co.         307           Warner Re Swasey Co.         18, 19           Warren Industries         174           Watts Bros.         700           Weber Machine Corp.         321           Weldex Incorporated         154           Weldon Tool Co.         32           Wendt-Sonis Co.         166           Weston Co.         219           Westoct Chuck Co., Inc.         63           Western Manufacturing Co.         345           Western Tool & Mfg. Co.         188           Westinghouse Electric & Mfg. Co.         183           Whitpel Manufacturing Co.         346           Whitney Banufacturing Co.         346           Whitney Metal Tool Co.         368           Whitney Metal Tool Co.         368           Wiledemann Machine Co.         388           Willey's Carbide Tool Co.         352           William & Co., J. H.         37           Willson K. R.         37           Wilson K. R.         37           Wilson K
Woodworth Co., N. A
Ziegler Tool Co., W. M327

Cover ... 52 ... 47 ... 112 ... 277 ... 148 ... 303 ... 274 ... 275 ... 370 ... 342 ... 109 ... 331 ... 245

Cover ... 250 ... 280 ... 308 ... 236 ... 331 ... 194 ... 22 ... 102 ... 283 ... 295 ... 350 ... 341

... 238 ... 294 ... 364 7, 311 ... 317 ... 347 ... 279 ... 339 ... 82 ... 355 ... 79 ... 151 ... 187 ... 384

..380 ..399 ..308 ..233





But the Air-Master can and will take the dust and grit that is so injurious to humans and expensive machinery.

Provide your grinding and buffing wheels with the Air-Master and you'll protect your workers' health and eliminate the frequent mechanical breakdowns due to the harmful dust and grit sent flying through the air. The Air-Master traps this destructive dust and grit the moment it files off the wheels.

A size for every grinder and buffer.

Easy to install . . . easy to clean.

Write today for descriptive literature.

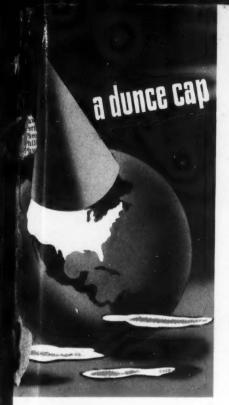
The Cincinnati

ELECTRIC DRILLS . GRINDERS . BUFFERS . PORTABLE TOOLS

The Cincinnati Electrical Tool Co.

3810-4

MADISON ROAD



# for America?

In the corner of the little one room, red school house there stood a high stool. On it was a coneshaped head piece. This wasn't often used, but when it was, the class goon wasn't the only one who wore it. Even the smart one, at some time or other, had to wear it for "not paying attention".

"Not paying attention" claimed more dunce cap victims than any other cause.

Today, America suffers the tortures of war for "not having paid attention" to what was going on in the so-called "peaceful interim". While we leaf-raked and loafed, others planned and plotted. This war caught us off in a corner with the dunce cap on. Will the peace?

When present war production at any cost gives way to future product production at lowest cost, it's either "pay attention" to world markets, mass sales and low-cost production or again put on the dunce cap.

Returning service men and women will deserve a good turn. So will reconverting American industry. LeBlond will supply the good turn in lathes. They turn a profit as they produce your product. It isn't too soon to plan to retool for "peacework".

'11

it

d

1944









FOR ILLUSTRATED SPECIFICATIONS

HEAVY DUTY GEARED HEAD ENGINE LATHES TOOL ROOM LATHES

HEAVY DUTY GEARED HEAD GAP LATHES AUTOMATIC LATHES SUPER REGAL GEARED HEAD LATHES RAPID PRODUCTION LATHES AUTOMATIC CRANKSHAFT LATHES

No. 2 CUTTER GRINDER TITLE YOUR NAME ADDRESS. YOUR FIRM

LEBLOND BRANCH OFFICES

03 Lafayette St. CAnal 6 - 5281

Bonds Buy Bombs

Buy a Block-Buster Today

# HOLO-KROM



# COMPLETELY COLD FORGE

METHOD PATENTED, OWNED, CONTROLLED BY HOLO-KRO AND USED SOLELY IN THE MANUFACTURE OF HOLO-KRO FIBRO FORGED SOCKET SCREWS.

PRECISION MADE TO EXACTING STANDAR!

"Unfailing PERFORMANCE

THE HOLO-KROME SCREW CORP. HARTFORD 10, CONN.

# Modern Machine Shop

# PROSSER Carbide Grinders

These rugged, streamlined grinders are modern in every respect. They are unsurpassed for mast rapid rough grinding and finishing of carbides, stellite, high speed steel and other modern tools.

Furnished in beach or floor pe at several capacities, for wet or dry grinding, as desired. Attachments for chip breaker and drill grinding.

### A FEW SALIENT FEATURES:

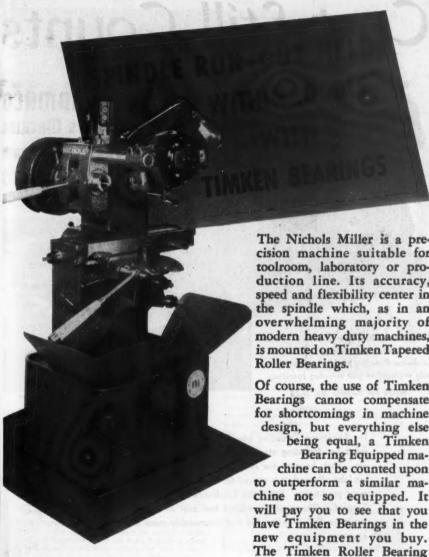
- Quick-acting indexing tables.
- · Adequate wet-grinding equipment.
  - · High Grade ball bearing spindles.
    - Oversize wheels, giving longer wheel life, and permitting grinding of larger tools. Moderate price.

Prompt Deliveries
Write for Details

**THOMAS PROSSER & SON** 

120 WALL STREET . NEW YORK 5, N. Y.





Latest model Nichols Miller, manufactured by W. H. Nichols and Sons, of Waltham, Mass. Spindle mounted on Timken Bearings.

The Nichols Miller is a precision machine suitable for toolroom, laboratory or production line. Its accuracy, speed and flexibility center in the spindle which, as in an overwhelming majority of modern heavy duty machines, is mounted on Timken Tapered Roller Bearings.

Of course, the use of Timken Bearings cannot compensate for shortcomings in machine design, but everything else being equal, a Timken Bearing Equipped machine can be counted upon to outperform a similar machine not so equipped. It will pay you to see that you have Timken Bearings in the

TAPERED ROLLER BEARINGS

Company, Canton 6, Ohio.

MODERN MACHINE SHOP

NIZE

rs. ve

ir

t-

or

d-

zi-

ID

S;

ES

## Cost Still Counts

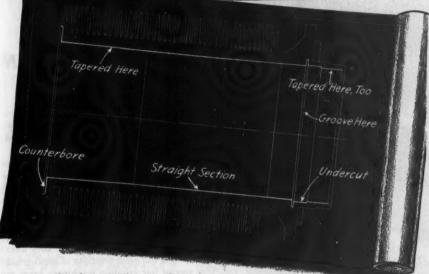


The Landmaco Threading Machine is the preference in most railroad shops for threading staybolts, taper head crown bolts, header bolts, etc. First, because the machine is easily set up—efficient for short run jobs. Second, it is geared for high threading speeds assuring maximum production. Third, the Landmaco employs the Landis long life Tangential Chaser which reduces tool cost to a minimum by producing more threads per grind and innumerably more threads per set of chasers.

LANDIS MACHINE COMPANY, WAYNESBORO

May.

# HOW A STUDY IN BLUE SAVED 13,000 MAN-HOURS



### Increased Production 300%, Improved Accuracy and Finish, Groutly Reduced Scrap

SOMEWHAT OF A tricky part it was—this aircraft engine cylinder.

It took three machines and a whole series of different set-ups to turn it out—and even then it was not satisfactory. There was considerable scrap, low, low production and of course, costs that couldn't help but be too high.

Then the engine builder came to Heald. And "thinking it out paid out"—once again.

Heald Precisioneers suggested doing the job this way... a single set-up...a single machine — the Heald No. 46B Double-end Bore-matic.

This versatile machine generates the tapers at both ends of the cylinder, machines the central straight section in one continuous cut, using specially designed cam-controlled tool slides to turn the trick. Grooves and recesses are then machined by hydraulic cross-feed units.

Result: A new conception of precision—greatly supersor alignment, concentricity, squareness, finish and dimensional accuracy. Rejections...practically sero. Production...times three. Man-hours awed... 13,000.

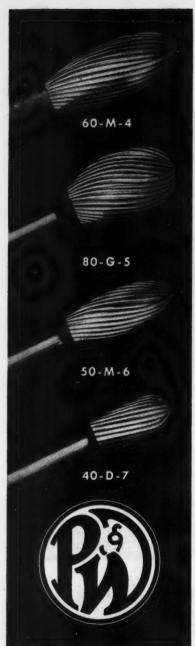
Problems . . . now or post-war? Let us help you. The Heald Machine Company, Worcester 6, Massachusetts.



HEALD for more Precision ... Faster!

Internal and Surface Grinding Machines • Bore-matic Precision Finishing Machines

S



### BURS NOW...

### DELIVERED FROM OUR STOCK

You may obtain immediate delivery of the four types of Pratt & Whitney Kellerslex Burs shown. Other types available on reasonable delivery schedules.

Human element removed: Pratt & Whitney burs are machine ground from solid. Each one is a precision cutting tool — every flute spaced exactly with relation to all others — each cutting edge with precisely the correct rake — all teeth identical in height and chip clearance. And every one is ground concentric, to run true on its shank. There is no guesswork or human error in these burs . . . they didn't just "grow," like the garden variety of hand-ground bur. Our special bur grinding machinery takes out all the human error — assures you of smoother operation, smoother results in finished work, greater production per hour and per bur.

Wet-grinding eliminates burned cutting edges. All burs ground on special Pratt & Whitney bur grinding machinery are ground wet. This gives a smooth finish for faster chip removal — and eliminates the danger of burned cutting edges. Hand-grinding is ordinarily done dry.

More for your money. Try Pratt & Whitney Kellersler Burs on your next order. They will give you more for your money because each one is precision made on special machinery designed by Pratt & Whitney engineers for the purpose.

PRATT & WHITNEY
Division NILES-BEMENT-POND COMPANY
KELLERFLEX SALES DIVISION
WEST HARTFORD, CONN.

MODERN MACHINE SHOP

May, 1944

Th

By

sin

dri

Th

use



The Farrel Manger Coupling has been designed for applications where space limitations make a close-coupled connection necessary or desirable. By bolting the coupling flange directly to a flywheel, brake drum or similar component, complete flexibility is provided between driving and driven units in balf the axial space occupied by an ordinary coupling. And, in addition, no dummy, pilot or stub shaft is required.

The Manger Coupling is simple in construction, easy to install and align, and requires practically no maintenance. It is the coupling to use when space limitation is a problem.

Write for complete information. Ask for a copy of Bulletin No. 446. No cost, no obligation.



nd-

oth

the

is

el-

ion

NY ON N.

944



mult

with

by th

by t

heav

ated

GIS

1219

Loo

Si by a

T



### SMOOTH PULLING POWER ...with a 12-speed change of pace

WHATEVER the power requirements in turning metals—for high speeds, low speeds, or the heaviest multiple cuts—Gisholt turret lathes supply it smoothly with 12 speeds, forward and reverse.

The power is there... plenty of it. Cuts are limited only by the ability of cutting tools to take it. Accuracy is assured by the rigid strength to absorb the shock and stress of heavy feeds without vibration.

Simple lever control of the spindle may be supplanted by automatic speed changing with Gisholt's power-operated Speed Selector. Full information on request

GISHOLT MACHINE COMPANY
1219 E. Washington Ave. • Madison 3, Wisconsin

Look Ahead—Keep Ahead—With Gisholt Improvements in Metal Turning



Precise as a five watch, Gisholt's 12-speed transmission provides forward and reverse speeds imple geometrical progression for efficient cutting speeds on all diameters of work.

### Accurate radii and spericalise

added to



variety of ce

Cap

The device illustrated above...a Radius Truing Attachment for CINCINNATI No. 2 Centerless Grinders... is a typical CINCINNATI engineering application of the Centerless method to a wider variety of parts requiring precision grinding operations. This attachment offers several grinding wheel truing possibilities:

- 1. Truing corner of wheel, 0 to 3/4" radius.
- Truing convex crown on narrow wheels, 90° included angle, 0 to <sup>3</sup>/<sub>4</sub>" radius, where W (max.) = 1.4 R.
- 3. Truing concave radius in wheel within a definite range grouping. (5/32" to 9/32", 9/32" to 13/32", 13/32" to 9/16", 9/16" to 3/4", 3/4" to 1", 1" to 11/4", 11/4" to 11/2").
- Truing concave radius in wheel, any radius desired from 5/32" to 1½", with interchangeable blocks.
- Change from convex to concave truing with interchangeable elements.

The attachment may be affixed to the wheel guard to suit the width of wheels being used, and, in addition, it has a 2" cross adjustment for positioning the diamond. The unit may be attached to any CINCINNATI No. 2 Centerless Grinder, right in your own shop. Additional details will be sent on request.



# lesections

### centerless work

Capacity, convex 0 to 3/4" radius—up to 90° included angle.



Convex Truingcrown on wheel.



Convex Trainginside corner.

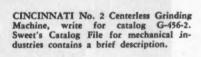


Convex Truingoutside corner.



Concave Truing (with additional equipment).





CINCINNATI GRINDERS INCORPORATED SINCHHAM

MACHINES CENTERTIPE GRINDING MACHINES ... CENTERLESS GRINDING MACHINES ... CENTERLESS LAPPING MACHINES

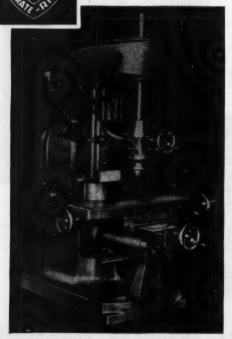
# BALANCED DESIGN in Knight Millers

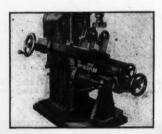
Knight Millers are designed as a balanced unit for handling a wide variety of work. They are properly proportioned to give strength and power for handling large as well as small work.

A combination of first class materials, workmanship and modern design enables Knight Millers to produce high production at low costs.

Safety is a major factor and ample protection is provided for both operator and machine.

Write for illustrated catalog.





Milling and boring a template four inches longer than table trayel.

> W. B. KNIGHT MACHINERY COMPANY

# Involute Inspection IS THE KEYSTONE OF PRECISION GEAR MANUFACTURING



Fellows Involute Measuring Machine

Which brings us to the fact that a Fellows Involute Measuring Machine is not only simple to operate, but is flexible in application, and a sound investment that pays dividends in the production losses which it prevents.

Every shop, large or small, that is turning out precision gears in quantity should investigate the advantages of this machine.

Write us for the descriptive bulletin on Fellows Involute Measuring Machines.

THE FELLOWS GEAR SHAPER

# Investigate!

### CONC. TO LANDIS TOOL COMPANY FOR

LANDIS TOOL is proud to present an outstanding new machine—the No. 12 Centerless Grinder.

Back of this development is over fifty years of practical experience. During that time, the LANDIS TOOL Company has made available to industry a wide variety of precision grinding equipment. Recognition has been international.

Those who can economically use a Centerless Grinder will find the LANDIS TOOL No. 12 a real aid in the never ending search for further means of cost reduction and product improvement. Operator acceptance, always an important factor, is bound to follow the installation of this easy-to-operate grinder.

Bring your grinding problems to LANDIS TOOL. This can be done with the assurance that the recommendations you receive will be sound recommendations for we now offer a variety of sizes and types which includes plain, universal, crank, cam, roll, radial, centerless, valve and crankshaft regrinding machines.

Get complete information about this latest member of the LANDIS TOOL family by filling in and returning the coupon to the right.

### FEATURES OF DESIGN

Regulating wheel base carried on hydraulically operated cross slide, which permits easier wheel dressing, quick and positive work rest blade alignment and easier alignment of the regulating wheel with the grinding wheel.

Regulating wheel base may be swiveled for grinding of tapers which gives a more uniform peripheral speed to the work and eliminates wheel loss due to unnecessary truing of the wheel when changing over from a straight surface to a taper surface or vice versa.

Work rest mounted directly and solidly on machine bed with elevating screws under each end of work rest blade to make set-up easier and quicker for thrufeed grinding operations.

Both regulating wheel base and grinding wheel base completely self-contained with drive to spindles through multiple V belts and with Landis Microsphere wheel spindle bearings used for both spindles.

Centralized main control grouping includes the grinding wheel feed handwheel; quick acting feed lever; master start button; master stop button; wheel dresser and regulating wheel speed controls and three-stage motor selector switch for set-up, grinding and dressing.

### LANDIS TOOL COMPANY WAYNESBORO, PENNSYLVANIA

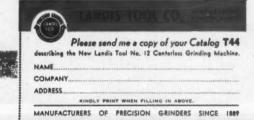


Be sure to fill in and mail the coupon now

### THE NEW LANDIS TOOL 112 CENTERLESS GRINDER

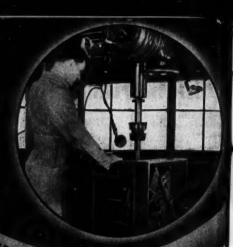


Here is a front view of the new, clean looking, functionally efficient LANDIS TOOL No. 12 Centerless Grinder.



YOU WILL BENEFIT

# FOSOICK RADIAL



### EX-CELL-O CORPORATION

The part being drilled is only one of many parts of various Ex-Cell-O machines that are drilled, tapped or bored on the sturdy, time and labor saving FOSDICK RADIAL DRILL.

A box jig holds the work while drilling, reaming or tapping various diameter holes from two or more sides.

Note the convenience and time-saving features of centralized control in the head. A wide range of feed and speed changes, as well as hand feed, are instantly available.

If your work can be handled on a Radial, it can be done on a Fosdick. Write for Bulletin MSR for full particulars.

**FOSDICK** 

MACHINE TOOL COMPANY



### THE CINCINNATI PLANER CO...CINCINNATI, OHIO

### THE CINCINNATI PLANER CO., Forrer & Quillen, Cincinnati 9, Ohio

Attached is one dollar for which I am to receive a copy of the 1944 edition of the "Treatise on Planers."

Name		Title	
Company	7, 10 1911	Zone	
Street	City	State	

only

ous are

on

bor

AL

hile

ing

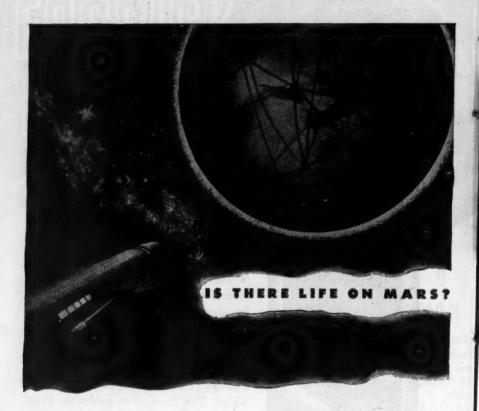
and en-

eed

ed.

lled

tin ers.



It is one of the most fascinating riddles of our time. For powerful telescopes have brought to light a strange network of "canals" on the planet's surface . . . Magnifying a celestial spark to the size of the moon, the power of light and a lens reveals facts never before suspected.

We have a parallel to make that is likewise interesting, and may be of importance to you. We manufacture an industrial instrument known as the Jones & Lamson Optical Comparator. It, too, consists primarily of light and a lens. Its purpose: rapid, accurate inspection.

Now this machine—by means of an enlarged shadow—reveals facts about the nature and the accuracy of parts that are often unobtainable by any other method of gaging. It makes possible the measurement and inspection of complex surfaces faster, more reliably and more easily than is possible with any other form of gage.

Because of this, Jones & Lamson Optical Comparators are in use today by leading producers in virtually every line of production . . . and the record of these machines in helping to cut costs and speed production is the important part of the story.

In the change-over ahead, Jones & Lamson Optical Comparators are going to be of tremendous value. Why not get ready now to meet—and beat—fierce postwar competition? Jones & Lamson Inspection Engineers can help you. Call on them now.

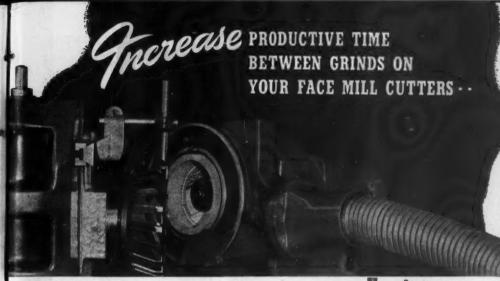
### JONES & LAMSON

MACHINE COMPANY SPRINGFIELD, VERMONT, U. S. A.



Monufacturers of: Universal Turnet Lathes • Fay Autometic Lethes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers.

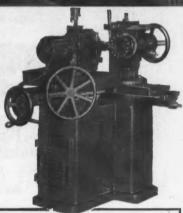
Profit-producing Machine Tools



### Assure a Greater Return From Your Milling Machine Investment

Avoid waste of valuable productive time by constant changing of face mill cutters. The Milwaukee Face Mill Grinder sharpens each tooth accurately - makes cutters last longer - require less frequent re-grinding - decreases "down-time" on your milling machines.

An indispensable machine of strength, precision and capacity, the Milwaukee Grinder grinds Tungsten Carbide and other cutters, ranging from 3 inch to 16 inch diameters, to within .0002 runout - and does it fast.



#### **MILWAUKEE FACE MILL GRINDER FEATURES:**

- Unusual Rigidity
- Accuracy to within .0002 runout
- Finger-tip controls handily located for simplified operation
- Design and performance of the Milwaukee substantially reduces sharpening time
- The three-bearing dynamically balanced grinding wheel spindle rotates at 3400 r.p.m.; heavy flywheel keeps abrasive wheel up to full grinding speed maintains accurate uniform cutting action - each tooth perfectly ground.



 Set-ups quickly made with graduated dial, facilitating quick adjustments

For complete information write for Bulletin 41-A

Rotary Head Milling Machine

Autometric Jig Borers Center Scope

Milwaukee, Wisconsin

idiary of Kearney & Trecker Corporatio

Milwaukee Face Mill Grinder Milwaukee Midgetmill

Milwaukee

# A ONE MACHINE TOOLROOM WITH GUARANTEED PRECISION

The Rivett No. 608 is a super-precision, back-geared screwcutting bench lathe designed for fine manufacturing, repair and experimental work. In tool-making and instrument shops it will handle a great variety of parts within the closest precision limits.

Finely made attachments for milling, spiral cutting, slotting, relieving, taper turning, ball turning, grinding, forming and multiple operations enable the user of a fully equipped No. 608 to finish his work completely without recourse to other machines, and throughout his entire series of operations to utilize the inherent precision of the lathe itself.

Write for Bulletin 608





TAPPING ATTACHMENTS

FLEXIBLE

SHAFT MACHINES

GROUND

ROTARY FILES

OUICK CHANGE CHUCKS

AND COLLETS

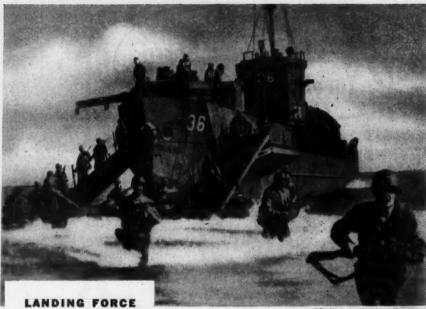
### They save Time and Taps

Jarvis Tapping Attachments for high speed production. Built for long, dependable service. Famous for long tap life and extreme accuracy. Save time and taps with Jarvis High Speed Tappers.

Send for our new catalog MFTI

THE CHARLES L. JARVIS COMPANY
MIDDLETOWN, . CONN.

WY

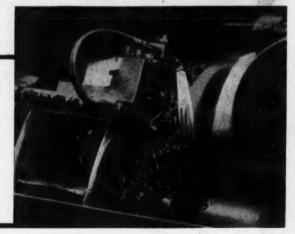


Oficial U. S. Army Signal Corps Photograph

LANDING FORCE abroad needs full machine support at home. To maintain peak output in METAL CUTTING use...

...SINCLAIR CUT-TING OILS and COOLANTS. These oils are made for continuous high speed cutting on precision work. They promote faster output with finer finish and reduce time out for tool regrinds.

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)



### SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY (INC.), 430 FIFTH AVENUE, NEW YORK 20, N. Y.

HOLDS

ITS SHAPE

CUTS COOL

AND FAST!

THE NEW "

CHIEFICOM

22 ALUMINOX

"AMERICAN" presents a new No. 22
Abrasive wheel . for centerless, for centerle



AMERICAN EMERY WHEEL WORKS

ESTABLISHED 1898

PROVIDENCE, 1

RHODE ISLAND





# THE *Avey*CAM FEED UNIT

No. 1 Size—½" capacity in cast iron.
No. 2 Size—½" capacity in cast iron.

designed for simple automatic indexing when duplication of operation on any number of faces of work is required

THE AVEY DRILLING MACHINE CO. CINCINNATI . OHIO . U. S. A.

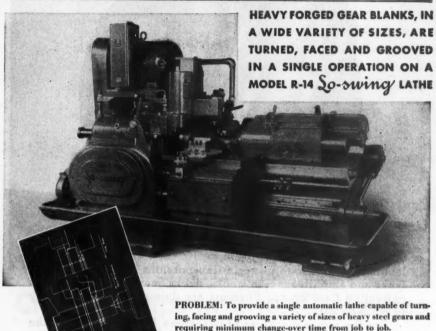
The AVEY Cam Feed Unit (Avey Automatic Method No. 1)—a low capital investment. It decreases the cost per piece in production. This is accomplished by Speeding Production—Less Operator Fatigue—the enabling of semi-skilled operators to deliver High Quality Production. Speedily, Accurately, Efficiently, and with a minimum of supervision.





### F OF THE W

PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-owing PEOPLE" SENECA FALLS, NEW YORK



Have You Received Your

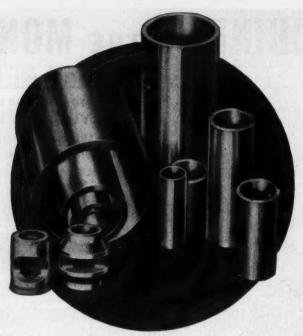


Bulletin D-43 describes 18 standardized models of this time and laborsaving Work Driver. Write for your copy today. Seneca Falls Machine Co., Seneca Falls, N. Y.

requiring minimum change-over time from job to job.

SOLUTION: The R-14 Lo-swing Lathe was chosen for this job primarily because it had the power and capacity necessary to handle heavy steel gears, varying in size from 4%" to approx, imately 10" diameter. The built-in, Quick Change-over Mechanism on this lathe also provided a simple and speedy means for varying the carriage stroke, as required for each individual gear job. Forged gear blanks come to the lathe with only the hole finished. Drive is by arbor through this hole as seen in the drawing above which illustrates typical tooling for one of the gears.

In order to simplify tooling, this Model R-14 Lo-swing was equipped with a standard Third Slide or Overarm which carries the grooving tools. Turning is accomplished with the Front Carriage tools while tools on the Back Attachment face the sides of the gears.



■ In engines for combat planes, trainers, and transports—in landing gear and controls—in transmissions and final drives of tanks and amphibians—in trucks, ducks, jeeps and gun mounts—Bunting Cast Bronze Bearings are doing extraordinary duty in modern war.

For the future machines of peacetime Bunting will offer the advanced Cast Bronze Bearings which war has helped to develop.

Finished bearings, ready to install in machinery of every kind, and Bunting Factory Finished Tubular and Solid Bronze Bars are available from stock. Ask your wholesaler. Write for catalog.

For special bearings, engineered to your particular requirements, our engineering services are promptly and gladly available...The Bunting Brass & Bronze Company, Toledo, Ohio. Warehouses in Principal Cities.

# BRONZE BUSHINGS & BEARINGS & PRECISION BRONZE BARS



### Cleans Sumps in 2 to 10 Minutes

A portable vacuum producer with a 125 gallon tank, on wheels, picks up liquid at the rate of 40 gallons per minute. Machine emptied by gravity in 2 minutes or elevates liquid by pressure up to 6 feet.

Filter basket collects chips, float valve prevents overfilling. No priming necessary. 3/4 and 1/2 h.p. models. Ask for the bulletin.

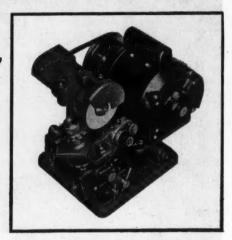
### SPENCER VACUUM

CLEANING

THE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

### ANNOUNCING THE NEW

CUTTER SHARPENER



### Available with index plates or pawl locating attachment

The new Waltham Cutter Sharpener is designed to keep cutters in production—to make sharpening a fast, accurate operation—to do this easily and economically even with inexperienced labor.

This machine can be used for sharpening cutters such as those used for gear cutting and thread milling, circular form tools, straight fluted hobs, and multiple cutters. These may be sharpened radially or with any desired rake angle. Maximum capacity is 2" diameter and 3/9" thick.

The standard machine is designed to use an index plate for each cutter size. A pawl locating attachment can be furnished for locating on the top relieved portion, or the back of the teeth if desired.

The Waltham Cutter Sharpener is complete—put it on any handy bench—plug into a 110-volt line—it's ready to go, and ready to sharpen cutters for maximum efficiency. Complete information will be found in a new, illustrated catalog—send coupon for your free copy today!

Please send me new folder giving full details on the Waltham Cutter Sharpener. M.M.S.

NAME\_\_\_\_\_\_ (IILE\_\_

COMPANY

STATE

EDWARD BLAKE CO.
634 COMMONWEALTH AVE.
NEWTON CENTRE 59, MASS.

BLANT TAP CRINDERS - FILTAIRE PORTABLE DUST COLLECTORS - AMERICAN TOOL HOLDERS - BLACK DIAMOND PRECISION DRILL GRINDERS - L & D HIGH SPEED DRILL PRESSES - WALTHAM CUTTER SHARPENERS



### IT'S THE 2-in-1 WHEEL

The same Por-os-way wheel—at a deeper cut—can often be used for rough grinding as well as finishing.



#### THIS MAKES THE DIFFERENCE

It's easy to see the difference between an ordinary wheel (top) and a Por-os-way wheel(bottom). Por-os-way's extra porosity results in over 8 distinct operating advantages.

\*T.M.Rev.U.S.Pat.Off.

Copyright, 1944, A. P. de Sanno & Son, Inc.

#### CHECK FOR CHIP CLEARANCE

Grinding wheels, just as twist drills, need clearance. Por-os-way's structure provides chip clearance NATURALLY.



Por-os-way Users List Reads Like a Blue Book of American Industry. A few are:

E. C. Atkins & Co. • Bell Aircraft • Edward G. Budd Mfg. Co. • Buick Motor Division of General Motors • Kinner Motors, Inc. • Studebaker Corporation • Thompson Aircraft Products • Wadell Engineering Co. • Westinghouse Electric • Wright Aeronautical

270 5 TIMES

RADIAC\*

### POR-OS-WAY

A. P. DE SANNO & SON, INC.

440 Wheatland St.; Pheenixville, Pa., Since 1893
New York - Pittsburgh - Cleveland - Betreit - Chicago - Las Angeles
Radiac POR-OS-WAY - Radiac PARAFLEX - Radiac Mounted
Points and Mounted Wheels - Radiac Internal Grinding Wheels
Radiac Abrasive Cut-Off Machines and Disc.





COUNTERSINKING CRANKSHAFTS CIRCLE-R COMBINATION CENTER DRILLS WERE "Made to Order" For This Operation



These drills are coping with one of the toughest crankshaft production jobs in the automotive industry. In this capacity a smaller size combined drill and countersink is used for spotting, followed up with a larger size drill.





CIRCLE-R CENTER REAMERS are helping to boost production in the airplane industry where they

are used for countersinking of rivet holes. Circular Tool furnishes the majority of reamers used for this purpose.

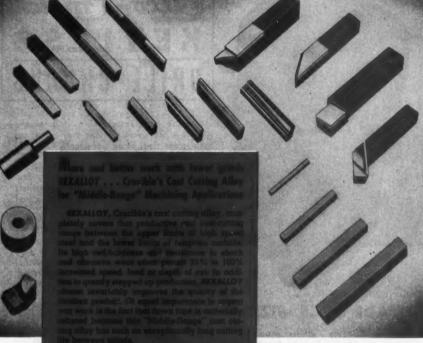
Send today for Circular Catalog - K

### ® CIRCULAR TOOL CO., Inc. ®

PROVIDENCE 5,

INDIANAPOLIS . DETROIT

STANDARD TOOL BITS . STANDARD TIPPED TOOLS . SPECIAL TOOLS TIPPED AND SOLID . CASTINGS



Crucible Steel Co. of America 405 Lexington Ave., N. Y. 17, N. Y.

- Please mail me your new book, "RENALIOY CUTTING FOOLS".
- ☐ We would like to discuss the possible use of ASXALLOY in our plant.

Name\_ Firm ...

Addresa City \_

WINDUSTRY

of America

High Speed . Tool . Stainless . Alley Machinery . Special Purpose Steels

CRUCIBLE STEEL COMPANY

May, 1944

MODERN MACHINE SHOP

29

# Cut out waste motions and speed up your drilling-with



### MADE IN 5 SIZES

for No. 0 to 5/8" drills. Ideal for screw machines. Can be furnished with straight shanks for turrets. Also available to fit all makes of portable drills.

# Ettco-Emrick KEYLESS DRILL CHUCKS

Tightening and retightening drill chucks with keys are waste motions that mount up to a great deal of non-productive time in the course of a day's drilling.

Ettco-Emrick keyless, self-tightening drill chucks eliminate all these waste motions and give you the benefit in more actual drilling.

Furthermore, the keyless, self-tightening feature eliminates any need for strength in setting up drills and makes it just as easy for women to use these drill chucks as for men. Drilling action does the tightening.

Once you use these Ettco-Emrick Keyless drill chucks and see for yourself how much time and energy they save, you too, will prefer them. There are no better chucks made.

### GET FULL DETAILS IN BULLETIN No. 6

Write today for your copy.

Chicago 6

ETTCO TOOL CO.

598 JOHNSON AVE., BROOKLYN 6, N. Y.

TAPPING ATTACHMENTS . TAPPING MACHINES

MULTIPLE SPINDLE TAPPING AND DRILLING HEADS

Detroit 1

Unexcelled for Design, Materials and Workmanship

Salvage those worn-out tools--

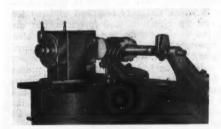
With a little ingenuity, worn-out tools often can be converted to new and different uses on the Covel No. 22 universal cutter and tool grinder, saving not only materials, but time and money as well.

The No. 22 puts sharp, fresh cutting edges on worn tools and cutters, trimming away a minimum of the precious tool steel, now more valuable to the nation than gold.

COVEL CAN GIVE YOU PROMPT DELIVERY ON THE NO. 22.

Write for Bulletin MM-54.







Accurate edges on spiral milling cutters, reamers, and other tools, are ground with No. 22 high-precision adjustments, trimming away a minimum of metal and assuring long life to your equipment.







and Save Forging Steel Tool

The Ajax Steel & Forge Company, Detroit, has solved its cutting-off problems with a battery of MARVEL Saws. Before, billets were cut-off with a hammeran operation which not only required at least four men and tied up hammers and furnaces, but also resulted in the waste of a great deal of forging steel. Now two opertors with seven Marvel Saws supply the entire plant with billets cut to exact size from bars up to 18" x 18" square. In addition to their present MARVEL Saws, five of which are illustrated above, this company is adding a super-giant MARVEL No. 24 Hydraulic Hack Saw — the new mammoth saw that quickly cuts-off the toughest steels in sizes up to 24"

Our local MARVEL Sawing Engineer will gladly call at your plant, study your metal cutting problems and make recommendations as to methods and equipment. Write for new Catalog.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave. Chicago 39, U. S.
Eastern Warehouse and Sales: 225 Lafayette St., N. Y.



That's why Morse Tools help to increase production.

TOOLS ARE WEAPONS --- TREAT 'EM RIGHT!

MORSE

TWIST DRILL AND MACHINE COMPANY NEW BEDFORD, MASS., U.S.A.

NEW YORK STORE: 130 LAFAYETTE ST. - - - CHICAGO STORE: 570 WEST RANDOLPH ST.

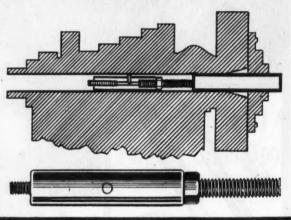
### STEP-UP YOUR LATHE PRODUCTION WITH THE CARLSON Spindle LATHE STOP

The Carlson Spindle Lathe Stop is designed to speed up and simplify lather operation, especially in machining parts on a mass production schedule. When placed at correct position in spindle for first part, it automatically provides permanent set-up for remaining parts to be machined to same dimensions. regardless of quantity. The Stop can be placed anywhere within the spindle, It is fitted with an adjustable screw which can be extended out in center of chuck jaws when chuck is needed for working on small parts.

- . SPEEDS OUTPUT
- **e REDUCES REJECTS**
- . SAVES SET-UP TIME
- · ASSURES ACCURACY
- e REQUIRES ONLY SEMI-SKILLED LABOR

SILY ATTACHED The Carlson Spindle Lathe

Stop can be installed in a few minutes. When ordering, please mention make and model of lathe; also specify inside diameter of lathe spindle.



MODEL No. 101 - Inside diameter 34-inch fits South Bend, Logan, Atlas, Sheldon, and other make benchtype lathes. PRICES ON OTHER SIZES FURNISHED ON REQUEST

DEALERS' INQUIRIES INVITED

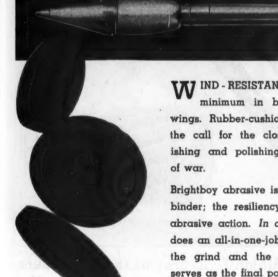
### SCHULTZ & ANDERSON CO.

109 EDISON PLACE, NEWARK, 5, N. J.

MANUFACTURED BY GREENFIELD MACHINE & TOOL WORKS

May





IND-RESISTANCE must be reduced to a minimum in bazooka shells and bomber wings. Rubber-cushioned Brightboy Abrasives get the call for the close-tolerance de-burring, finishing and polishing of these vital implements of war.

Brightboy abrasive is impregnated throughout the binder; the resiliency of the rubber controls the abrasive action. In a single operation, Brightboy does an all-in-one-job—bridging the gap between the grind and the buff. The finish frequently serves as the final polish. Brightboy is made in a wide variety of shapes and sizes for machine and manual work.

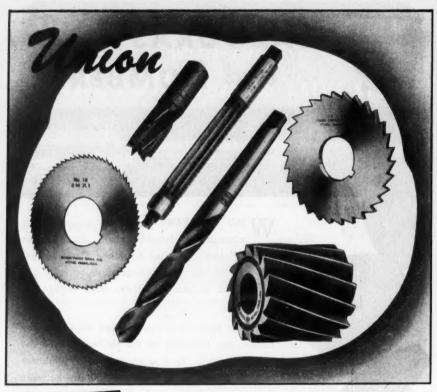
Ask our Service Department or field representatives how to save time—improve quality—in your abrasive finishing. Ask your dealer for prices and Applications Data.

#### BRIGHTBOY INDUSTRIAL DIVISION

WELDON ROBERTS RUBBER CO.

Newark 7, N. J.





TWIST DRILLSMILLING CUTTERS
GEAR CUTTERS
HOBS
SAWS
TAPS
DIES
REAMERS
END MILLS
SCREW PLATES

• Union Tools provide the kind of service that gets the maximum production from your machines.

Union Tools are the kind that you buy again and again. They are not excelled for lasting accuracy and dependability. Choose Union Tools — they satisfy — on every job.

# UNION TWIST DRILL COMPANY

NEW YORK

DETROIT

36

- 61 READE ST.
- 6540 ANTOINE ST.
- SAN FRANCISCO .
  - . 121 SECOND ST.
- SEATTLE
- 524 E. FOURTH ST. 568 FIRST AVE. S.

US

The

plan

follo

facti



Photos Courtesy Consolidated Vultee

### Consolidated vultee

#### USES 13 MOORE JIG BORERS IN THE LINE

The first two machines of this battery of thirteen entered the San Diego Consolidated plants in the late fall of 1939. In the first four months of 1941, six were added, and the following year five more joined the line. There is no better proof of jig borer satisfaction than a service record such as this, with a producer for whom performance only counts in the building of Liberator Bombers.

RANGE: In the boring of holes in jigs, fixtures, dies, gages and special, accurate machine parts, the Moore Jig Borer is highly sensitive for holes of 1/32" diameter, yet rugged for heavy cuts up to 4½". TOLERANGES: Consistently .0002" and better. COORDINATE LOCATION: By the Moore system of coordinate location, attainable through lead screws ground to an accuracy never achieved before, the operator spots, drills, reams and bores in one uninterrupted sequence.

Write today for full details on the Moore Jig Borer and Jig Grinder

MOORE SPECIAL



TOOL COMPANY INC

740 UNION AVENUE, BRIDGEPORT 7, CONN



3117 Lincoln Avenue San Diego, California November 26, 1943

Mr. Elmer Ellstrom C/o Dearborn Gage 22038 Beech Street Dearborn, Michigan

Dear Mr. Ellstrom:

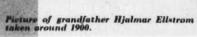
It was with great interest that I read your company's ad in the November issue of the Aviation Navember about your father, Hjalmar about the real background of Ellstrom, and the real background the famous Swedish gage blocks.

the famous Swedish gage blocks.

Through my own father I heard a Through my own father I heard lot about your Dad's and Abrahamslor services and services and services and services and services and services and took mortant in and took mortant take any creat worldwide important take any great worldwide intention to and his famous not my intention and the famous on any from Johansson with the glad lines work in connection with the glad lines work in connection with the glad lines and so work in connection with the services about your and to back up my state about your paint to back up my state ment.

3. 6. Granstedl. Gustav C. Granstedt

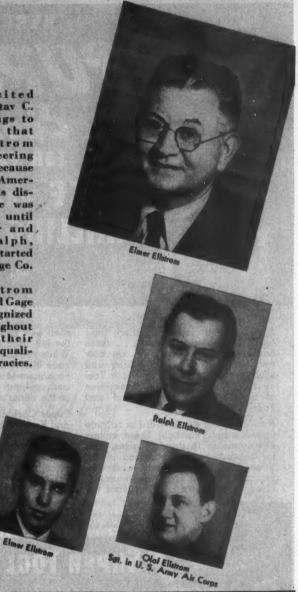






is unsolicited letter from Gustav C. Granstedt brings to light the part that Hialmar Ellstrom played in pioneering the gage block. Because he never came to America to exploit his discovery his name was not known here until his son Elmer and. grandsons Ralph. Elmer and Olof started the Dearborn Gage Co. in 1937.

Today, Ellstrom Chromium Plated Gage Blocks are recognized by industry throughout the world for their longer wearing qualities and fine accuracies.





DEARBORN GAGE COMPANY, 22038 Beech Street . Dearborn, Michigan

Originators of Chromium Plated Gage Blocks

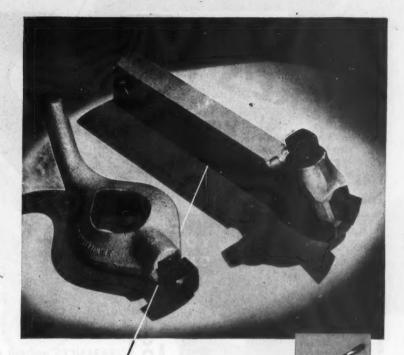


Faster cutting, cleaner cutting, finer finishes, greater accuracy . . . these carbide tipped efficiencies are now available for your face milling and shell end milling jobs. For Super Tool engineers have developed this new line of Carbide Tipped Shell End and Face Mills!

Here's another step forward in carbide tipped standardization! These cutters are available in standard sizes, both for non-ferrous materials and in the Super NEGRAK (negative rake) type for cutting steel. They are manufactured on a production basis and the shell end mills may be purchased in the left-hand type at standard prices. When you buy a Super Carbide Tipped Face Mill or Shell End Mill, you enjoy economies that start with the first cost and continue through every operation of the cutter's exceptionally long life.

Super Carbide Tipped Shell End Mills and Face Mills are worthy additions to the line of Super Carbide Tipped Tools—tools that are setting new records of performance and economy on all types of cutting jobs the country over. Write TODAY for details of the complete Super Tool line.





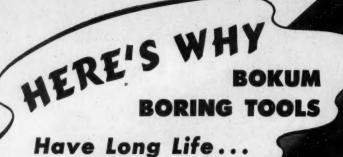
# Seed for Victory

TOOLS BUILD MACHINES . . .

men and machines win modern wars . . . That the Allied Nations may have machines superior to the enemy's, we build better with better tools ... Fine tools, like Williams', in the hands of free and will-

> ing labor, are indeed the seed for Victory. J. H. Williams & Co., Buffalo 7, New York.

DROP FORGINGS AND



YOU SHARPEN ONLY ONE FACE



LEARANCES are not effected by repeated sharpenings.

Each tool will take thousands of sharpenings without causing its form to change.

The original form remains constant due to the angle of the cutting edge and the helical backed-off form of front of tool.

Thus, sharpenings being made on the line of radius, life of tool is equal to the number of sharpenings represented in its circumference.

The same unique design that characterizes this general boring tool (Style A) also distinguishes the two other types of Bokum Tools—Style B for facing and bottoming and Style C for internal threading.

For super High Speed Tools, ask for Catalog B-1139 and for Carbide Tipped B-398.

BOKUM TOOL CO.

4775 WILDEMERE AVE. DETROIT 21. MICH.

42

H

mou

pow

thei

wei

the

1.

T



# HOW WE DOUBLED THE Results Per Man

THIS foundry was using twelve flexible shaft grinders at 9,000 R.P.M. with small mounted points for cleaning inside machine tool castings. Production was slow. Manpower and additional tools were scarce.

S

The Rotor Application Engineer analyzed their problem and recommended small, lightweight 20,000 R. P.M. air grinders to give the job the right surface feet per minute. Result:

 Higher R.P.M. and surface speed doubled the output per man.

- 2. Fewer jobs returned for recleaning.
- 3. Lower tool maintenance.

Perhaps the R. A. E. could find similar economies in your cleaning operations. He's at your service. No obligation.

Yours for the right tool,

AIR O'TOOL

AIR

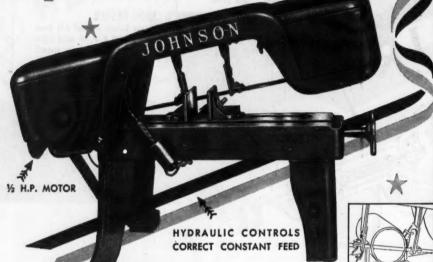
ROTOR TOOL

CLEVELAND, OHIO

MON CACH

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS





# JOHNSON

METAL CUT-OFF

### BAND SAW

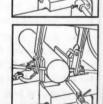
4 CUTTING SPEEDS

10" x 18" CAPACITY

#### OTHER FEATURES:

Rigid box-type frame — Sturdy over-all construction—Three point base — Wide range in cutting speeds — Quick acting vise — Imwet cutting ATTACHMENT FOR proved hydraulic control — Bolt action stock stop — Ball bearing motor — Extremely simple operation.

WET CUTTING ATTACHMENT FOR THIS DRY MODEL ALSO AVAILABLE



Mac

before hand why were Mac "Mod structured and Mod prec der large reliance and mod precession and mod precessi

macl

meni

SHE

May,

#### IOHNSON MANUFACTURING CORP., Albion, Mich.

Write for all details to: SALES OFFICE: 5000-4 CHRYSLER BUILDING, New York, N. Y.

MODERN MACHINE SHOP

May, 1944



# Helpful tips which will increase the capacity of your G. & L. Boring Machine



# Rotary Tables

Rotary tables permit the machining of various surfaces without resetting the part. For instance, four or more sides of a workpiece can be machined by merely indexing the table to present the face to be machined to the machine spindle. G. & L. Rotary Tables are available from the simple, plain 24-inch diameter rotary table with 1/2° graduations up to the largest completely selfcontained units weighing 55,000 lbs., with a rated capacity for parts weighing up to 25 tons.



### Universal Tilting and Rotary Tables

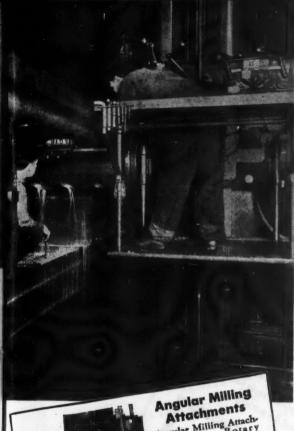
These univare primarily intendenese units are primarily intended for use in connection with floor-type machines. The table top can be refated 360° and can top can be retated 360° and can also be tilted to any position the horizontal to the vertical. Machining of angular surfaces and the boring and drilling of holes of verticus anoles is faces and the boring and drilling of holes at various angles is greatly facilitated. This table is approximately 41" high and approximately 41" high and degrees and half degrees.





GIDDINGS & LEWIS

146 DOTY STREET



Angular Milling Attachments, like Rotary Tables, are used to minimize the number of setsings of the workpiece.

mize the number of settings of the workpiece. They are usually furnished so that the head of the attachment is adjustable through 360° and Justable through 360° and In some cases, side and

clamped to any desired angle. In some cases, side and milling attachments are recommended. These cach sist of two spindles operating at right angles of each other. Special angular attachments to suit your specific work can be designed and furnished.



# Continuous Feed Facing and Boring Head

This outstanding attachment permits facing and boring operations simultaneously and many other combinations of operations not ordinarily performed with the horizontal boring, drilling and milling machine. It is provided with a tool slide having six separate continuous power feeds.



(Above) G. & L. 340 RT Machine with built-in rotary table.

#### Combinations of Attachments and Accessories

Oftentimes, combinations of various attachments and accessories can be used to advantage in reducing set-up time and increasing production. G. & L. field engineers will be glad to work with you in making proper selections.

Write for Additional Data

MACHINE TOOL COMPANY







automatic Rotation PROFILING



A Typical HIGH PRODUCTION Profiling Jobdone on the Gorton 9-J Duplicator. 10 elliptical wells—no two the same size—on each of these cylindrical work pieces are rough and finish cymuricas work pieces are rough and mish milled, with beveled edges—simply by combina-tion of Tracer Control, with Automatic Rotation of work and master, geared to table movement.

all controlled by one central lever motion. Blank cylinders come to the Gorton Duplicator, history cylinders come to the Corton Duplicator, the state of the state of the first rough milled to a depth of .052". Then a finish cut, with the same cutter and spindle speed, removes .010" stock, merely by lowering spindle the required amount. Hand finishing required is almost negligible—due to the excellent finish obtained by the use of 2-flute Tungsten Carbide form cutters—at Gorton high spindle speeds.

Meterial S.A.E. 1020 Seamless Steel Tubing. Beterial—S.A.E. 1020 Seamless Steel Tubing.

Operation—Rough and Finish Milling of 10

Wells varying from 34" wide x 36" long.

Cylinders—99/16" O.D. x 735/32" long.

Cylinders—99/16" O.D. x 735/32" long.

Feel—Manual

Food—Manual

Tolorantes—±.005"

Telerances—±.005".
Time—Roughing 18 minutes; finishing 23 minutes; total floor-to-floor, wells complete, average 4.5 min. per well.) wells complete, average 4.5 min. Telerantes ±.005

# ENGINEERING SERVICE ... FREE

ENUMERING SERVICE . . . FARSE of 10 years of Have the advantage of 50 years of Grown Specialized Experience in your shop—call near Experience in your shop—call near set Gorton dealer or write to Gorton factory at Racine, Wisconsin.









# DRTON Precision













#### TEAR OFF COUPON AND MAIL TODAY

1705-13 Racine St., Racine, Wis Send me those free books ondensed Catalog





But you must take proper care of them just as you would other highgrade cutting tools.

Use Bath Taps on work for which they are designed — lubricate them — run fast — watch alignment — keep sharp — don't force — never allow flutes to clog — never use a worn-out holder.

John Bath & Company, Inc.

WORCESTER

MASS

# vrnose S PLAIN TYPE PLAIN TYPE-A fast utility machine for a wide variety of the average shop work and for training



PRODUCTION TYPE - Massively constructed with a large table to handle medium heavy work. Large cumbersome pieces may be easily clamped directly to the apron by removing the table. Power rapid traverse and power down feed accelerate production and reduce operator's fatigue.



purposes in industrial schools. Fine for accuracy on small jobs, such as machining parallels, small fixtures, vee blocks, dovetail slides, racks, small spur



UNIVERSAL TYPE - Ideal for tool and die work, experimental laboratories and model shops or where angular work set-ups are required. Particularly adaptable for shaping wedges, gibs, internal openings, complicated fixtures, molding dies, etc.

IN 16", 20" and 24" SIZES "Lubrigard" Safety Device Increases

Immediate Deliveries on Firm Orders! Write for Rustrated to

Manufacturers of Precision Equipment

ST. LOUIS 4. MISSOURI



Appropriate apologies for paraphrasing an old proverb! But isn't it the truth?

There is no provision today for error. There is too much at stake. Highly mechanized warfare staged against a bitter, ruthless enemy demands a constant flow of war machines, flawless in construction and exact in every detail. Gears furnish the vital motive power for these engines of destruction—gears decide whether we can out-shoot, out-fly or out-maneuver the enemy. That is the gear maker's responsibility.

VINCO also has a responsibility: to provide speedy, accurate methods of checking the various phases of gear production. VINCO GEAR ROLLING FIXTURES, VINCO MASTER GEARS and the VINCO INVOLUTE CHECKER are doing a masterful job in helping to maintain peak gear production.

VINCO CORPORATION

The above insert is a Vinco Gear Rolling Fishere designed to check backlesh and run-out on an internal gear—and of hundreds of specially designed gear rolling fisheres that are proving invaluable side to loading manufacturers is, maintaining a high production of procision gears.

SALES OFFICES
IEW YORK and CHICAGO

MILLIONTHS OF AN INCH FOR SALE BY V I N C O

Semi-Automatic Hydraulic Spline and Geor Grinder + Optical Master Inspection Dividing Hend + Involute Checker + Angle Tangent to Radius Disesses

\*Index Plates + Frecision Visar + Sins Bars + Shealph-laid Spline, Sensation Spline, Invalute Spline and Helizal Spline Plug and Ring Gages + Thread
Plugs, Rings and Setting Plug Gages + Spur and Helizal Master Geors + Multinon Gages + Propeller Hub Gages + Built-up and Special Gages + Goor
Rating Protures + Spline and Index Fistures + Hydraulic Power, Control. Utilisation and Outstableton Units + Engineering, Design and Development.

It's a whale of a job to turn one of these big ship propellers. Here again Macwhyte ATLAS Braided Wire Rope Slings came to the rescue. Now it's comparatively simple. Do you want to improve your rigging methods? Consult Macwhyte.



• A safe sling gives workmen confidence... speeds up work, production... helps plant morale.

Macwhyte Slings are safe slings. Before you decide on the design of your sling gear, before you decide on how you will wrap up your load for attachment to cranes...ask Macwhyte for helpful suggestions.

You'll get practical cooperation and

suggestions based on experience with hundreds of others doing jobs like yours.

Macwhyte Slings are in great demand but our pledge to you is: "We will continually produce to the utmost of our ability without sacrifice of quality. We will study your handling needs with you and help you plan the design on which the best delivery can be made."



#### MACWHYTE COMPANY

2965 Fourteenth Avenue, Kenosha, Wisconsin

Manufacturers of the correct wire rope for your equipment

Left-&-Right Lay Braided Slings · Aircraft Tie-Rods · Aircraft Cable · "Safe-Lock" Swaged Terminals

Mill Depots: New York · Pittsburgh · Chicago · Ft. Worth · Portland · Seattle

San Francisco · Distributors throughout the U.S.A.

NO. 742A-6

# MACWHYTE SLINGS FOR INDUSTRY Lifting safety to new heights"

When larger cranes are built, Macwhyte ATLAS Braided Wire Rope Slings will be made to meet their capacity

\* Let's ALL back the attack - buy ANOTHER War Bond! \*



Today's standards of finishes are far and beyond those of yesterday. To acquire them without sacrifice of production time is a goal which everyone seeks.

Finish must now be measured in micro inches. That's where the new Chicago FV BOND Wheels excel. They give a precision smoothness so intensified that it passes any surface analyzer test, in many cases eliminating hand lapping and auxiliary finishing operations.

#### HERE'S WHAT MAKES CHICAGO WHEELS CLICK-



A—Sensational new FV BOND.Result of research and experiment on hundreds of aircraft jobs.

B—No sacrifice of cutting time or wheel life.

FV BOND is available in all types of Chicago Mounted and Small Grinding Wheels—in all abrasives, grain and grade combinations.

YES YOU CAN FINISH IT BETTER

PERFECT FINISH

# CHICAGO MOUNTED WHEELS and Small GRINDING WHEELS

A complete range of styles, grains and sizes up to 3" in diameter to give you a perfect finish on every job.

**PROMPT DELIVERY** Specialization—with full WPB approval—on sizes 3" in diameter and under, means no waiting for Chicago Grinding or Mounted Wheels. Let us take care of your present and post-war requirements.

#### **FREE Engineering Analysis**

If you have a grinding problem, tell us about it. Our experts will go into a huddle and give you the benefit of long experience making millions of custom built wheels for every conceivable operation.

#### **FREE Test Wheel**

To prove their superiority in your own, shop, send for a Chicago Wheel made with FV BOND. Give us details of the job, material you want to finish and we'll do the rest.

Half a Century of Specialization has Established our Reputation as the Small Wheel People of the Abrasive Industry.

Write for Catalog and interesting Engineering Survey Form

CHICAGO WHEEL & MFG. CO.

1101 West Monroe Street

Dept. MM

Chicago 7, III.

vey form, interested in

Mounted Wheels

ABBRES



TRY a TRU-LINE Engineered Diamond Tool and you'll learn first hand why production men everywhere are turning to TRU-LINE. For TRU-LINE Diamond Tools engineered to your job will give you all these savings in time and money:

YOU'LL SAVE because the TRU-LINE multiple diamond tool requires no turning. That means less machine down time—greater production.

YOU'LL SAVE because of the unique feature of placing the diamonds in over-

WHEEL TRUEING TOOL COMPANY

3200 W. DAVISON AVE. DETROIT 6. MICHIGAN lapping rows. This provides a continuous cutting surface for the life of the tool.

YOU'LL SAVE because the thin blade that dissipates heat rapidly is made of our own alloy that forms a rugged, chemical bond with the diamonds, thus permitting the diamonds to be used up entirely.

YOU'LL SAVE because the use of smaller, high quality, carefully selected diamonds means much lower tool costs.

There is a TRU-LINE Tool for every type of straight, profile or step dressing operation—one that will bring to your job faster production, greater accuracy and remarkable savings in wheel dressing costs. Try one TODAY!

# HAVE YOU RECEIVED A COPY OF THE TRU-LINE BOOK?

It gives complete details, illustrations and prices of this complete line of money-saving diamond wheel dressing tools. Write for your free copy today.



The LUBRIPLATE film is tough . . . the toughest lubricating film you have ever used. It holds contacting surfaces apart, even under the heaviest loads, thus effectively preventing progressive wear. Examination of a bearing surface lubricated with LUBRI-PLATE always shows a mirror finish.

LUBRIPLATE is a most exceptional lubricant. It keeps friction down to a minimum, thus conserves power. It prevents rust and corrosion. Its effective life is longer than conventional lubricants, therefore it is more economical to use.

The remarkable achievements of LUBRIPLATE are told in the "LUBRIPLATE FILM." It contains case histories and general lubricating information written especially for your industry. Send for a copy today.

# R FOR YOUR MACHINERY

No. 3-Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers,

80. 8 - Because of its high film strength and long life reflects outstanding performance in most types of onclosed guars (speed reducers).

No. NO - One of the most popular greece type products for general application by pressure gus or cups,

No. 70-For a wide range of greate applications, especially at temperatures above 200 degrees E.

86. 198-AA-Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

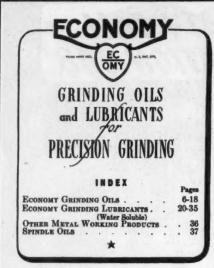
BMI SIARISO—This is the LUBRIPLATE Inbricant that has achieved wide acclaim for use in the general rus of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F

#### LUBRIPLATE DIVISION

FISKE BROTHERS REFINING COMPANY

NEWARK N J. CINICE 1070 TOLEDO. O.

SINCE 1870



# Precision Grinding-Faster Smoother

Greater speed with precision grinding by ECONOMY oils and lubricants. New performance records are described and photographically illustrated in this new book which is yours for the asking. The subject of oil grinding and water soluble grinding lubricants is explained in detail and other useful information given in its pages. Write us about your grinding problems, types of machines operated, nature of work performed, and kinds of materials ground, so we may send you recommendation for the oil or lubricant which experience has proved to be best and most economical for your particular work.

Send today for your copy of this handbook, 1944-F-16, on grinding oils and lubricants. Please use your company letterhead.

# THE WHITE & BAGLEY COMPANY

WORCESTER, MASS., Chicago, Detroit, Minneapolis

#### MODERN COLLET 1s Back In Business!

On Christmas Day of last year, the Modern Collet and Machine Company plant lay in smouldering ruins. Today, the company is again producing collets and feed fingers... a new, modern factory is under construction... and within a very short time full production will be resumed in all of the various departments which were in operation before the fire.

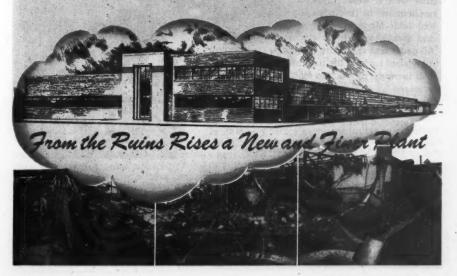
Over the past few years, more than 5000 concerns have used Modern Products—spring collets, feed fingers, collet tubes, chucking fingers, alloy steel cams, equalizing finger holders, and all other perishable parts and tools for screw machines. Many have had screw machines rebuilt and spindle carriers modernized in the department set up for that purpose.

If you were one of these customers, you found Modern Collet a most dependable source of supply. Consider then how much more you can expect in the futere from the same company operating an up-to-the-minute, carefully designed plant in which the newest and finest equipment is installed . . . and with a reorganized management that knows how these facilities must be utilized to meet your requirements. Modern Collet is back in business . . . to offer better products and more efficient service than at any time in the company's 22 year history.

#### MODERN COLLET and MACHINE CO.

401 Salliotte Street

Ecorse 18, Michigan





TORQ-QUA-MATIC

"Torq-qua-matic" transmissions are readily adaptable with a wide range of applications in the machine tool field. Made in standard

and special sizes to meet exact requirements.
All gears and shafts are of special heat treated alloy steel for long life and maximum capacity.
Will increase production efficiency 25 per cent or more.

Write for illustrated folder describing Torq-qua-matic transmissions.

Torq Motors and Transmissions provide Power in Reserve.



TORQ-QUA-MATIC ON A MILLER

THE TORQ ELECTRIC



MANUFACTURING CO.

CLEVELAND, OHIO

# Distortion Gree! MEEHANITE METAL



These precision production tools incorporate every factor that contributes to accuracy. The Honeycomb pattern surface plate distributes the weight evenly over the entire surface. Meehanite Metal—a specially processed iron recognized for its uniform texture, fine close grain, strength and solidity, through all sections. A special heat treatment is given the iron to relieve casting and machine strains. This PREVENTS distortion and changes from taking place after the surface has once been scraped.

**Send for Precision Tool Catalog** 

ACME TOOL COMPANY 202 CHURCH ST.





MACHINE WORKS

ROCKFORD . ILLINOIS



THE SUPERIOR REPLACEMENT LOT CUTTING

Lubricoolant represents a new theory in the lubrication and cooling of cutting tools. It has 2 to 3 times the heat distools. It has 2 to 3 times the heat dissipating power... therefore, it holds work down to temperatures not measureably above room temperature.

As a result, tool life is increased... higher speeds are made possible... mirror surface is assured... no "dry-welding" of chips to the cutting edge of tools. Lubriccolant sets new standards of working cleanliness. It's transparent . . . not a milky solution. Smoking and objectionable fumes eliminated! Dermatitis is reduced to the minimum. Andit's completely water washable, requiring no solvents for thorough removal prior to finishing operations.

For recommendations to suit your specific job, and for the complete story of this new coolant discovery, write to:

### THE DUBOIS COMPANY

CINCINNATI 3, OHIO

SERVICE MEN AND WAREHOUSE STOCKS COAST TO COAST

of tools.

# for ACCURACY and ACTION!

# A Full Service In Cutting Tools To Your Specifications

Your orders for cutting tools will receive special attention here.

Special fixtures and equipment many of our own design—plus rigid inspection—make it possible for us to handle difficult designs of cutting tools with accuracy and speed.

## SPECIAL FACILITIES FOR MILLING CUTTERS

dovetails—Flat form tools and tool bits

Specially attractive schedules for cutting tools of the above types (except form relief milling cutters).

Note—we make no tools for stock—all tools made to your blue prints or specifications. Illustrated circular on request. Send us your inquiries for prompt estimates.

### WARREN INDUSTRIES

26667 Mound Road, Warren, Mich.



TWO RUBBER CUSHIONED
BEARINGS,
one of each of the two hinge points
connecting countershaft and headstock, absorb motor vibration.

TWO RUBBER

between motor mounting and pedestal further nates transmission of vibration.

Swing over bed. 101/2"... bed length. 421/4"... spindle hole. 2"/52"... capacity. %" with push type collet... 6-position automatic indexing turret... stroke of turret. 41/4".... 12 spindle speeds from 30 to 1450 r.p.m... moving parts protected by ball bearings or sail-lubricating bronse bearings.



No. 840
Quick Change Gear Turret
Lathe with automatic apron

motor vibration absorbed

In Logan Lathes the smooth operation essential to finely finished precision work is doubly assured... first, by rubber cushioning at vital points...second.

by carrying the countershaft on a three-point suspension. To absorb the motor's vibration, to prevent its transfer to the lathe proper, the patented Logan countershaft is rubber cushioned at all three of its main supporting points... the pedestal red and the two hinge pins. In addition, the cone pulley guard, which covers both countershaft and headstock, rests on rubber buttons. The entire Logan countershaft assembly is so designed that at no point is there a direct metal-to-metal contact between countershaft and headstock. Furthermore, the three-point suspension steadies the whole countershaft assembly so that it cannot rock. This combination of rubber cushioning and three-point suspension is another example of the advanced design that assures sustained accuracy, safe operation, long life, and high-speed, low-cost production in all models of Logan Lathes. Write today for your copy of the latest Logan Catalog.

LOGAN

ENGINEERING CO

CHICAGO 30, ILLINOIS

One of a series describing the finer features of Logan Lathes



FOR pack annealing of their fine milling cutters, holders and bits, the O. K. Tool Company of Shelton, Conn.

use Hevi Duty Roller Hearth Box Furnaces. Flexibility of loading combined with the precision operation of these furnaces are important factors in the production of their quality product.

Send for Bulletin HD -441

#### HEVI DUTY ELECTRIC COMPANY

HEAT REATING PURHAGES HE HOUSE PROTECT EXCLUSIVELY

66

# New Model

llichols Miller

Here's the New Model of one of the most versatile precision milling machines on the market.

Besides conventional milling, the Nichols Miller performs dozens of unusual operations—such as profiling, boring, turning, facing, diamond wheel-grinding—to tolerances in tenths. Rise-and-fall spindle arrangement and a full line of attachments make the Nichols especially valuable for the toolroom or laboratory.

Worth remembering: Several thousand of these millers are in operation the world over —and we've never required a full-time service man!

WORKING SURFACE: 64" x 21", or 64" x 30".

RANGE: Longitudinal, 10" or 19"; Transverse,
7"; Vertical-Knee, 13'4"; Spindle Rise and Fell,
4'4". STANDARD SPEEDS: to 2400 RPM. SPECIAL
SPEEDS: to 5000 RPM.

Also Available—Nichols Millers for special requirements. Nichols Double-Spindle Millers for high-production needs.

Immediate Deliveries—Send today for descriptive literature and free 86-page Handbook of unusual applications.

#### EXAMPLES OF NICHOLS VERSATILITY

(Left to right)

PROFILE MILLING, using template and follower, with remarkable ease of control, workpiece under full view. RACK AND PINION TRANSVERSE FEED, available in place of standard feed screw for rapid motion on drilling, end-milling and boring operations.



NICHOLS-MORRIS CORPORATION

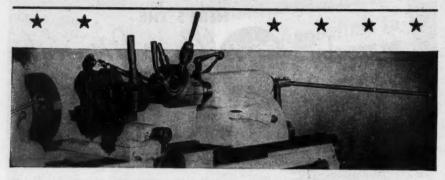
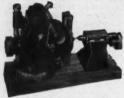


Photo above shows Jefferson Turrets on 16" lathe



71/2" Swivel Base Dividing

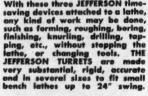
In Stock — Immediate Delivery - No Priority Required

#### Convert YOUR ENGINE Stock Turret LATHE INTO A TURRET LATHE IN 15 SECONDS

Yes, it's as easy as that!
You simply attach the Jef-ferson Tail-Stock Turret, the Jefferson Tool-Post Turret, and the Jefferson Adjustable Pull Foed to your lathes as shown in illustration.

The productive capacity of these machines will be more than doubled in many instances because there will be available at all times NINE DIFFERENT TOOLS. With these three JEFFERSON time-

5-Tool Tail-





PAT. PENDING

4-Tool Tool-Post Turret

6" Tilting Dividing Head with 3 Indexing Plates and Tailsteck— Immediate Delivery.

Some territories still open for dealers and salesmen. Jefferson Turrets are real production tools—substantial, rigid, accurate and adaptable to any size or make of engine lathes. They must not be confused with the small makeshift gadgets now on the market.

TURRET DELIVERIES IN 6 DAYS

MACHINE TOOL 750 W. Fourth St., Cincinnati, Ohio

Tool-Post Turrets, Tail-Stock Turrets, Adjustable Pull Feeds, Belt Sanders, Gyratory Foundry Riddles, Overhead Swing Frame Grinders, Milling Machines, Dividing Heads and Vises.

Ma



# RIGHT

# to Specifications PRECISION EXACTNESS ACCURACY

And make it a RULE to consult WINTER ENGINEERS for the right answers for meeting tapping schedules on time.

The RIGHT Tap for the job is important! The RIGHT lubrication! Speed of operation! Properly designed cutting edges! WINTER ENGINEERS can give you the correct answers to these and many other questions; often saving hours of operating time, and increasing tap life. WINTER TAPS are good taps. Handled with care, and kept sharp they will be cutting good threads long after you would normally expect to discard them.

The NATIONAL TWIST DRILL & TOOL GO.

Detroit, Michigan



var eas and spe

read

May



Hy-Draulic Slotters do fast work in the manufacture and maintenance of locomotives and other railway equipment, ordnance parts, pumps, compressors, diesel engines and a wide variety of other products. They are accurate, easy to operate, highly efficient. Cutting speeds and feeds are infinitely adjustable throughout specified ranges. The exact combination of speed and feed most suitable for each job can be established quickly and easily; can be altered readily if required by changing conditions.

Cutting speed is uniform from beginning to end of chip, reversals smooth and shockless, return ratios higher than mechanical drives. These and other advantages enable operators of Hy-Draulic Slotters to establish and maintain new high production records, without excessive fatigue.

One of the early 36" stroke Hy-Draulic Slotters is shown at top right, current design in center. Hy-Draulic Slotter, 12" stroke, also available. Investigate. Write today for Bulletin 1906.

#### ROCKFORD MACHINE TOOL CO., ROCKFORD, ILLINOIS















# How to Step Up Production 50% to 150%

With wear resistance far higher than high-speed steel; shock resistance higher than tungsten carbide; greater toughness at dull red heat than when cold—Speedaloy cuts best at speeds 50% to 150% higher than high-speed steel.

This solid cast non-ferrous alloy, composed mainly of cobalt, tungsten and chromium, withstands heat up to 1450 F and gives long cutting life between grinds. Resists abrasion, corrosion and most acids. Non-magnetic. Low friction coefficient.

Exceptionally effective on metals that generate high heat—stain-less steel, manganese steel, tough alloy steels, etc.

Speed your production—cut operating costs — save time losses—by equipping your machines with Speedaloy tools. Available in standard solid blanks — squares, flats, tubes, work rests, milling cutter blades — also tipped blanks . . . Write today for FREE Speedaloy Bulletin giving sizes and full information.

TUNGSTEN ALLOY MFG. CO., 65 Colden St., Newark 4, N. J.

# SPEEDALOY TOOL BITS • TIPPED TOOLS

FOR FINER FASTER FINISHING

Use (REME)

MOTO-TOOLS

Model 2 Moto-Tool, complete with accessories, as illustrated, in felt-lined hardwood case— \$23.50. Model 2 Moto-Tool only, with emery wheel point — \$16.50.

27,000 \

Band in machine shaps and tool cours for firishing intricate dies. Used on proceeders then to clear contings, turnings, and language, therpen tools and do hard rade of principal timishing, politicing, burring, routing and stelling

Dramel Mate-Tool has AC-DC mater with sheek-proof beliefly housing, olivered to lead to housing, olivered to least bearings, and belief to colling fun. Weight only 17 concess—so light and contest a guide to housing it with each Dynamically buleaused armsture aliminates vibration one provides precition control. Rate-Tool's fully again (27.000 rpm) permits floor, faster work—

"Dremel Moto-Teels are proving indispenseble olds in speeding up wer production in section agram Armo, ford. For all lead of a lab

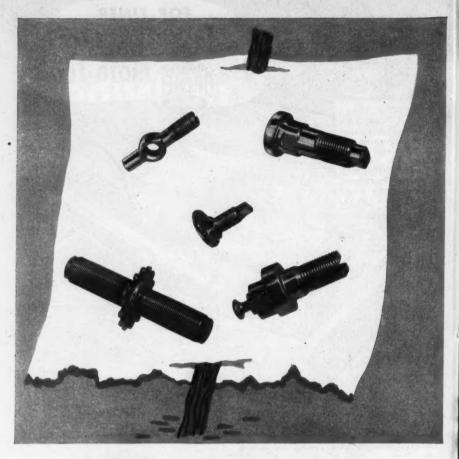
Try a formal flame lad an your man laborate water own datasets and have presented to be a property of the control of the contr

Percented SAss, 2637 F. Villey, All Council Collin.
NIII Person Products, 50 F. School Co., National Collins.
E. V. France, 157 Fortuna, 6 (15) (1), No.

Whether you have a Mata-Isol or any other type of gitting the series

799APTARPILITIEN

DREMEL MFG. CO. T 224 E RACINE, WIS.U.S.A.



## Products of Our Victory Garden

Cold forgings—just a few of the unusual shapes and sizes from the "good, rich earth" of Allied craftsmanship! Only years of careful cultivation of precision machinery and workmanship could make them possible.

Produced in one piece, from a coil of steel wire, Allied cold forgings are taking part in America's march to victory—in tanks, tractors, amphibians, jeeps, airplanes and other equipment of war. If you are producing

materiel for victory, the unusual strength, flexibility of design, and precise dimensions of these and other parts made by Allied Products Corporation may solve some of your production problems.

"IT'S AN ALLED PRODUCT!"... Allied Products Corporation and its divisions, Richard Brothers and Victor-Peninsular, in Detroit and Hillsdale, Michigan, also make: The original, patented R-B Interchangeable Punch and Die; sheet metal dies; plastic molds; jigs and fixtures; precision hardened and ground parts; and other special products.

## ALLIED PRODUCTS CORPORATION

Executive Offices: 4646 Lawton Avenue Detroit 8, Michigan

ALL FOUR PLANTS HAVE NOW ADDED A STAR TO THEIR ARMY-NAVY "E" PENNANTS

74 MODERN MACHINE SHOP

May, 1944

R

SPIR

SPEE KRW are for presse bringing in dev speed

work. thouse indust former

larger,

MEDI on A

## DSPED



SPIN THE HANDWHEEL and the ram speeds to the work by fast mechanical action instead of slow, laborious hydraulic pumping.



FLIP THE BALL ARM to close the valve instead of slowly turning a handwheel type control.



START PUMPING and immediately get tons of pressure on the work because the hydraulic cylinder was automatically filled with oil during oper. No. 1.

## QUICK MOTIONS OPERATE KRW HYDRAULIC PRESSES!

SPEED is the basic design feature of KRW Hydraulic Arbor Presses—they are faster than most power-operated presses. In operation, you get speed in bringing the ram to the work ... speed in developing hydraulic pressure... speed in raising the ram to remove the work. These KRW features have sold thousands of our hydraulic presses to industry where they are doing work formerly considered only possible on larger, heavier and more costly equip-

ment. Ingenious adaptations of KRW presses have been built to handle many kinds, sizes and types of material. All, of course, incorporate the KRW principle of SPEED in operation. Write for our new bulletin describing KRW Hydraulic Presses in 25, 50, 60 and 75-ton capacities.

formerly considered only possible on larger, heavier and more costly equip-

on AA-4 Priority or better

h,

ns

ed of

or.

or-

ie;

on ts.

TS

4



# MAKE TIME with "YANKEE" TOOLS!

Do the tools you buy make your work easier, faster, more efficient? Do they save you time, money, trouble? Will they stand the

pressure of hard work, earning their keep by long, dependable service? They will, indeed, if they are "Yankee" Fine Mechanics' Tools, the choice of true craftsmen everywhere, for more than half a century. There's only one trouble with "Yankee" Tools today, but that's a trouble that will be corrected quickly by Victory: Supply can't keep up with demand . . . for "Yankee" Tools, you see, are at work for war. So remember the built-in ingenuity of "Yankee" Screw Drivers, Drills, Vises, Bit-Braces, and Tap Wrenches. They've been designed to make time! And making time, above, is "Yankee" Spiral Screw Driver No. 130A—a size for every purpose. Order from your supply house, or write North Bros. Mfg. Co., Dept. MMS-544, Philadelphia, Pa. Furnish priority ratings whenever possible, and every effort will be made to fill your orders.

## "YANKEE" TOOLS

make good mechanics better

North Bros. Mfg. Co., Phila. 33, U. S. A.

Established 1880

MODERN MACHINE SHOP

May, 1944



Here is a giant's eye view of a Tom Thumb gear-in fact, there are two gears one has a hollow shaft through which the other's shaft passes without touching. These gears have 23 generated teeth, yet the pitch diameter is but .1278 of an inch. A very fine knurling on one end of the pin-sized shaft engages an indicating dial hand.

Made of nickle-silver, these minute gears are a part of actuating mechanisms in intricate aircraft instruments.

VARD makes many small racks, pinions and quadrants. VARD'S gear department has facilities to cut gears up to 5 inches P.D. in spiral bevel, helical, spur and worm types.

PASADENA 8, CALIFORNIA

# Rage

## GUSHER COOLANT PUMPS

Packing nut, foot and relief valves are eliminated — yet, there is no friction or binding, and no leakage. Large ball bearings and sturdy one-piece suspended shaft insure rigidity and longer life. Delivers coolant from a dribble to maximum capacity. There is a model and type for your needs. Write for complete new catalog.

**Model 11020-A**—Internal discharge type. Outside piping eliminated. From 1/10 to ¾ h.p.

## THE RUTHMAN MACHINERY CO.

THE "GUSHER"—A MODERN PUMP FOR MODERN MACHINE TOOLS.

Model

SAFE SILENT SURE Plus a 20% Gain in Production!

## LIPE

## PNEUMATIC BAR FEED

NO WHIPPING ENDS TO INJURE WORKERS: NO WHIRLING BARS TO CATCH CLOTHING—When there's not enough manpower to go around, reduce the number of man-hours lost through accidents and increase the output per man-hour. Lipe Pneumatic Bar Feed helps you to do both. Stock bars are fully enclosed; can't catch clothing or injure workers. The precision, automatic feed ends danger to operator's hands. And it saves up to 20 minutes on a 12 ft. bar.

NO BANGING OR CLANGING TO FRAY WORKERS' NERVES AND SLOW PRODUCTION—Noise saps energy, increases fatigue, alows production, causes accidents and absenteeism—especially among women workers. That's why special care has been taken to insure quiet operation in the Lipe Pneumatic Bar Feed. The bar is supported at both ends; there's no banging against the tube. And the low-pressure air advances the bar silently and surely against the fixed stop.

NO MARRING OR SCRATCHING OF POLISHED STOCK: NO DE-FORMATION OF THIN TUBES—Just a ball-bearing cup center in the air-piston, that's all that touches the stock. And the contact is at the very end. No feed fingers to scratch or mar, no pressure to deform thin-walled stock. You can use exact-size polished bars. Rejects are reduced. Refinishing is reduced. The number of acceptable pieces per hour is definitely increased.

UP TO 20% MORE OUTPUT AVERAGED PER HOUR—Available for all hand screw machines up to 21/2 a capacity, and for automatic screw machines Nos.



00, 0, 2 and 6. Drop us a line today, let a nearby technical representative call and tell you how Lipe Pneumatic Bar Feed will improve your screw machine output.

LIPE-Rollway Corporation

Syracuse, N.Y. U.S.A.



Squaring Shears. Convenient operation, quick, accurate setting of ball bearing self-measuring parallel back gage, full visibility of cutting line, instant-acting Niagara More production per man hour is being obtained in war plants using Niagara Power sleeve clutch and complete accessibility at rear are some of their modern features. Built in a complete range of capacities and sizes. Niagara Machine & Tool Works, Buffalo 11, N. Y. District Offices: Detroit, Cleveland, New York.

Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory regrinding service by the same skilled men who grind new Niagara knives.

SAND STAMPS

BONDS WAR STATES BUY UNITED

Write



TAM

Z

BOND

4

• Wetmore Producers are specially designed for extra heavy roughing and finishing operations—to remove large amounts of stock faster and better. Like all Wetmore products they have features that offer definite advantages where the high production of precision holes is desirable.

The type 41 Wetmore Producer, shown above, is for roughing; type 61, its companion model, is a finishing tool. Wetmore builds modifications of them for special requirements.

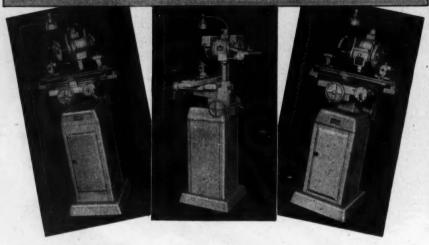
When reamers and boring bars are needed on the job Wetmore Tools are the natural answer. See your industrial distributor or write us direct.

Send for the new Wetmore catalog containing complete tool specifications and details together with important data and information you will want.

WETMORE REAMER CO., 418 N. 27th St., Dept. E, Milwaukee 8, Wis.



## UNIVERSAL TOOL GRINDERS



MODEL B600 UNIVERSAL TOOL GRINDER is built for 24 hour service. Maintenance or Production at Minimum Cost. Write for Bulletin U35-54. MODEL B604 UNIVERSAL CARBIDE TOOL GRINDER is built for fast and accurate grinding of conventional single point tools. Write for bulletin C-35-54. MODEL B660 UNIVERSAL TOOL GRINDER with multiple speed head is a new member of the K-O family. Operator has choice of speeds ranging from 1000 to 11,000 RPM. Write for Bulletin M35-54.



ABERDEEN

MODERN MACHINE SHOP

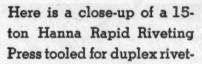
May, 1944

SOUTH DAKOTA

FOR BETTER RIVETING

FASTER...

HANNA
RIVETING PRESS
Tailored to
YOUR Job!



ing of a gear assembly—it's built to give top production on this specific operation. It is one example of the 500 styles and sizes Hanna has produced, both pneumatic and hydraulic, to handle rivets from 3/16" to 1-1/2" in diameter.

Whatever your riveting problem may be, take advantage of more than 40 years experience that Hanna has in the design and application of riveting presses. Send a decription of your work with blue prints—or a sample if you can.

Send for Hanna Riveter Catalog No. 232

## HANNA ENGINEERING WORKS

1765 ELSTON AVENUE

CHICAGO 22, ILLINOIS

RIVETERS . CYLINDERS . VALVES . AIR HOISTS

## Metal



DRY MODEL-

Machine illustrated is suitable for intermittent cutting.

#### WET MODEL-

Coolant attachment can be supplied for above machine or machine can be purchased as a complete unit with coolant. Attachment does not interfere with convenience or portability and permits high speed, continuous, straight line cutting.

Thousands of progressive war plants have learned that the Kalamazoo band saw is far more efficient. convenient and accurate on most of their cut-off work than other methods. They have learned that this compact, low-cost machine can do most of the work heretofore handled on large, expensive machines.

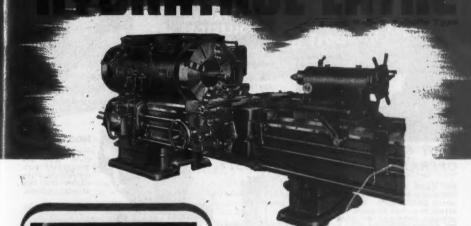
This equipment has pointed the way to increased savings NOW and also on after-the-war production.

Two sizes—8" x 16" and 8" x 24". Cuts solids, tubes or odd shapes. Four speeds for cutting any metal. Portable and plugs into light circuit.

Write for Bulletin or Ask your Dealer.

## E TOOL DIVISION

## Do it Better!...ona





"We found 4 different
machining jobs that we could
do better on a
Large Hollow Spindle Type
of Hydratrol Lathe!"

THROUGHOUT THE WAR — in hundreds of plants
— under all sorts of conditions — LEHMANN HYDRATROL LATHES have invariably brought about
faster production, better work, lower costs.

Look around your own shop — you may find a number of machining jobs which possibly could be done better on a Large Hollow Spindle Type of HYDRATROL LATHE. Send us prints of these unusual, difficult, or too-costly machining jobs, for a specific, time-and-money-saving recommendation.

#### Five Sizes-18" to 36"

Small . . . . . . 18" up to 7 1/4" Hole
Medium . . . . . 24" up to 12" Hole
Large . . . . . . 27" up to 13" Hole
Large . . . . . . 30" up to 14" Hole
Large . . . . . . 36" up to 16 1/2" Hole

(Standard type lathes, 16" to 36")

Lehmann

## Quick way to STOP DUST!



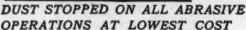
DUSTKOP SELF-CONTAINED DUST COLLECTORS

#### MODEL 600

DUSTKOPS are installed in a few minutes. Flexible metal hose makes slip fit with dust outlets on grinder.

#### MODEL 950

This unit, with dust hoods, "ready to go," fits any double-end pedestal grinder not already equipped with wheel guards and dust outlets.



For quick, economical, effective, dust control at the source, install DUSTKOPS. Easy to attach to surface grinders, disc grinders, cutter and tool grinders, flexible shaft grinders—or buffers, sanders and abrasive cut-offs—whether single or multiple units. Large or small models available.

DUSTKOPS are compact and portable. Entirely self contained, with motor, fan, cyclone separator (in all but smallest models) and spun glass filter. Flexible metal hose permits quick installation.

DUSTKOPS clean the dustladen air without wasting heat. Efficient cyclone separator provides low maintenance. Many other features make DUST-KOPS ideal for your shop or laboratory. Immediate shipment of "standard" voltage units.



MODEL 950—with cyclone separator means low first cost, low maintenance, even on production surface grinder.



MODEL 1250 one unit handles dust from four wheels.



With flat, spun glass filter for compact bench installation. Pulls all dust from two grinder wheels.



MODEL 950—has cyclone separator, plus spun glass filter. For medium duty work of all kinds.



MODEL 1250—gets all dust and smoke from this heavy duty abrasive cut-off, at extremely low cost.



AGET-DETROIT COMPANY

604 First National Building

Ann Arbor, Michigan

Detroit Office: Tel. CAdillor 3090

Deepfreeze Cascade 120° F. Industrial Chilling Machine

Does This Answer Your Questions About The NEW Deepfreeze Process **Cold Treating Metals?** 

What is the Deepfreeze Process?

It is the application of Deepfreeze Industrial Chilling Machines for the hardening, seasoning, shrinking and testing of metals by freezing at temperatures down to -120° F. The Deepfreeze process involves a new principle of refrigeration, which permits faster, more efficient heat removal.

#### What is the Cost of Deepfreeze?

The initial cost of only \$2,500 for the standard Cascade -120° F. Industrial Chilling Machine is quickly recovered in reduced production costs. One manufacturer saved from \$3,000 to \$4,000 per month in shrink-fit application. Gage manufacturers save time and money by seasoning gages to prevent change in finished size. The increased tool life resulting from cold treating reduces down-time and lowers tool cost.

#### How are Deepfreeze Sub-Zero Temperatures Being Used?

The possibilities for applying Deepfreeze Industrial Chilling Machines in your plant are practically unlimited. Here are but a few of the many applications finding widespread use in industry today:

steel cutting tools. Shrinking of metal.

Shrink-fit assembly. Stabilization of gages. Hardening of precision machine parts.

Treating of high speed Testing of aircraft instruments and ma-

> Testing of lubricants, paints, plastics, chemicals, synthetic rubber and pharma-ceuticals.

### Is the Deepfreeze Process Still in the **Experimental Stage?**

No! Hundreds of Deepfreeze Industrial Chilling Machines are now being used in actual production. Deepfreeze equipment has been tested and proven highly valuable by such firms as The General Electric Company, Timken-Detroit Axle Company, Dodge Motors, Pratt and Whitnev Division, Monsanto Chemical Company, Greenfield Tap and Die Corporation, Ford Motor Corporation.

#### **How Can Sub-Zero Temperatures Be** Adapted to My Work?

If, after checking uses listed here, you are not sure how sub-zero temperatures can be beneficially applied to your manufacturing, let Deepfreeze Engineers help you find the solution to your industrial metal chilling problems. The Deepfreeze representative in your territory will be glad to assist you in handling sample parts for a Deepfreeze test in the factory laboratory. There is no obligation.

#### What About Delivery?

If you can qualify, under government priority regulations, you can expect prompt delivery on Deepfreeze standard chilling machines.

### Where Can I Get More Information?

The complete and latest data on the use of sub-zero temperatures for industrial use can be found in the new Deepfreeze Metal Chilling Data Book. A Deepfreeze representative will be glad to answer other questions you may have and can furnish you with further information.

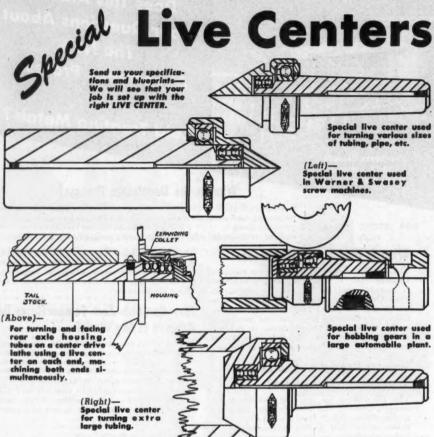


2318 DAVIS STREET NORTH CHICAGO, ILLINOIS

Industrial Chilling Equipment for Shrinking, Testing, Hardening and Stabilizing Metals

Birision of Motor Products Corporation, Betroit, Michigan

## **Live Centers**



Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action . . . that compensates for expansion due to heat, shock and excessive thrust loads—reducing wear to a minimum. A properly engineered live center is one of the fundamentals of setting up a job and requires a specialist's experience . . . standard shanks with Morse taper carried in stock. Prompt deliveries on high priorities.

# TO HELP YOU DO BETTER WORK Faster!

AMERICAN MOLE CHECKERS AMERICAN BENCH CENTERS

AIR-OPERATED HOLE CHECKER — Checks inside diameters to ten thousandths. Quickly determines size, taper, bell-mouth and out-of-round condition. Specially designed sizing plugs are made for your production parts. Can be used on any number of hole sizes by simply changing plugs.

The American Hole Checker is operated by controlled air pressure and volume. Dial can be calibrated so that graduations register 0.0001".

IMPROVED BENCH CENTER — Three sizes; for checking work up to 4" dia. x 10"; 6" dia. x 24" and 8" dia. x 36". Additional diameters possible by use of raising blocks.

Adjustable heads easily slid into position. Clamping levers hold heads in adjustment. Retracting lever permits quick removal of work. Special large size center fixtures and bull centers for checking practically any diameters.

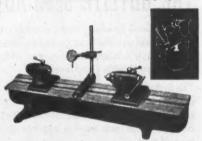
Box-type bed supported on three legs, always sits solidly on bench. Bed inclined 30° to facilitate handling of work and prevent its misuse as "catch-all." Indicator bracket and holder carries a .0001" dial indicator and is readily adjustable to all positions.

Send for Bulletin 43-M and prices on American Tools and Gages. Your inquiry solicited on special tools, dies and gages.





Hole Checker and sizing plugs



Note convenient working position at Bench Center



THE AMERICAN GAUGE CO. 125 Bayard St. DAYTON 1, OHIO



## UDYLITE'S AUTOMATIC ROTARY CONVEYOR WITH THE UDYLITE SEMI-AUTOMATIC PLATING MACHINE

If your metal finishing requirements call for exacting process and production control. If you could use the many advantages of a full automatic machine, at a fraction of the cost of such a machine, then you will want to investigate the above combination developed by Udylite's engineers.

The first cost of this set-up is amazingly economical. Their flexibility in converting from one use to another is new to the field. The clean and rinse cycle may be changed without altering plating time and one Udylite Automatic Rotary Conveyor, operating a clean and dry cycle, can serve a number of plating semi-automatics, each plating a different type of part.

It sounds too good to be true but it's a fact. We will be glad to discuss it with you.

## THE UDYLITE CORPORATION 1651 E. Grund Blvd., Detroit 11, Mich.

Chicago 12 1943 Walnut Street Long Island City I. N. Y. 11-16 44th Drive

Cleveland 3 4408 Carnegie Ave

## A Quiz FOR OPERATORS and OWNERS of SCREW MACHINES

What cut-off blade has hollow ground top which permits chip to leave cut with reduced friction against sidewalls?

What cut-off blade is T-shaped to provide side clearance?

What cut-off blade<sup>1</sup> is built with taper<sup>2</sup> along longitudinal cutting width to provide constant back clearance through repeated sharpenings?

What cut-off blade' causes chip to collapse, thereby allowing coolant to actually reach cutting edge?

What cut-off blade uses a holder that permits removal of blade without disturbing original set up?

### **BUY MORE WAR BONDS**

Also manufacturers of Empire Floating Tool Holders and distributors of Fastcut Centerdrills and Keyseat Cutters, ANSWER -- Empire Tool Compony's Lees Patented Cutting Off Blades's and Malders's 28ands

Sand for cetalon

PRODUCED UNDER LICENSE ISSUED BY JOHN MILTON LUCRS PATENTS, INC

EMPIRETONICO

8774 GRINNELL AVENUE DETROIT 13, MICHIGAN

















MACHINERY MANUFACTURING COMPANY

1915 EAST 51st STREET • LOS ANGELES 11. CALLEORNIA

Vernon Line of HORIZONTAL MILLS, VERTICAL MILLS and JIG BORERS, SHAPERS and GRINDERS





Manufactured by STOKES INDUSTRIES Cincinnati, Ohio

WASHINGTON, D. C.

529 UNION TRUST BLDG. Tel.: DISTRICT 5382

NEW YORK CITY

258 BROADWAY Tel.: BARCLAY 7-3318

94

CHICAGO, ILLINOIS 541 WEST WASHINGTON BLVD.

Tel.: STATE 3092

Rei

alu as dle

SP

ava

ins

va:

and

Ot

an

pla

spe pra

Spe

cor



THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN



Now...
SHE

## feeds a hungry

## machine

Sure . . . she could tote a tray with the best of them . . . and flash a smile and a quip that kept them coming. But punch the cash register? Neverl What did she know about machinery?

Well . . . look at her now . . . helping to win a war.

Easily operated, automatic, high speed machines, like the Bodine, enable thousands like her to handle ordnance parts at high production schedules. The Bodine basic principle of design combines an automatic indexing dial with multiple spindles which operate on work placed in position on the dial. Spindles may be located at variable work stations to perform drilling, milling, tapping and screw inserting from above, below or from any angle.

The operator merely feeds and ejects the work — although under many conditions even the ejection is automatic. Moreover, several operations may be performed on each part as it progresses from station to station during one cycle of the dial.

Yes, women may be quickly trained to become efficient operators . . and they like the low fatigue factor of running a Bodine.





## DRILLING, MILLING, TAPPING, SCREW INSERTING Timultaneously

#### **BODINE** does this:

- Builds 6 sizes of automatic dial type machines and develops correct tooling setups to perform the operations you require.
- 2. Provides extreme flexibility in the basic design to permit tooling for an exceptionally wide range of parts.
- 3. Provides up to 8 spindles with capacities ranging from 4" to 4" dia. with vertical stroke from 13/16" to 34" in depth.
- 4. Permits high speeds with extreme accuracy... minimizes down-time by means of automatic electrical devices which protect machines, tools and operator.

Ask Bodine engineers to make recommendations from your blue prints or sample parts to solve tough production problems. Interesting and instructive bulletin on request.

# MURCHEY NOW Offers NEW AND IMPROVED TANGENT CHASER TANGENT CHASER SELF OPENING DIE HEADS! SELF OPENING DIE HEADS!

MANUFACTURED of Special Alloy Steel, hardened and ground throughout, these Die Heads (Model "T" series) are expressly made to cut accurate threads on long production runs. They are designed to use Tangent Chasers—giving long chaser life; permanent throat; uniformity of finished work throughout the entire life of chasers and interchangeability of chasers.

Send for literature

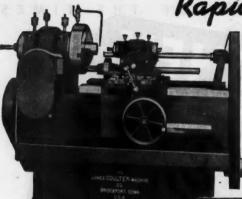
Also ask for literature on Collapsible Machine Tap; Self Opening Die Heads; Thread Milling Machines, Tapping Machines and Roller Pipe Cutting-off Machines.

MURCHEY MACHINE & TOOL CO.

Department M-3
DETROIT 26, MICHIGAN

MURCHEY

## Rapid Duplication



of
RIGHT OR LEFT HAND
THREADS

INTERNAL OR EXTERNAL

## COULTER



Any parts that can be held in ordinary chucks, air operated chucks, air operated collet chucks, or special face plate fixtures... can be threaded on this machine.

Set cam-controlled automatic cycle on first piece. Thereafter, cutter feeds into work to proper depth and at correct pitch and withdraws when cut is completed. Work and cutter spindles are driven by individual motors through worm drive, affording ample power throughout the wide range of feeds and speeds.

Write for complete specifications.

## The James COULTER Machine Co.

BRIDGEPORT

CONNECTICUT

U.S.A.

#### WHEN COLLET WORK IS INDICATED - SPECIFY

Precision Collets

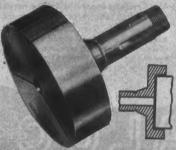
For 10" ATLAS & LOGAN, SOUTH BEND, SHELDON, CRAFTSMAN, POWR-KRAFT, CLAUSING and other important lathes.

#### IMMEDIATE DELIVERY FROM STOCK

The Precision name on a collet is your unconditional guarantee of accuracy in machining, hardening and grinding. Make sure then to specify Precision when ordering from your dealer. Literature on request.

- MODEL 3AT: For 10" Atlas, Logan, 12" Craftsman, No. 700 Powr-Kraft.
- MODEL 3C: For 8" & 9" South Bend, Clausing, Hardinge No. 3, 10" LeBlond, etc.
- . MODEL IA: For 8" & 9" South Bend.
- MODEL 5C: For 9", 10", 16", 18" South Bend, 1" capacity Sheldon, Schauer, Sebastian, etc.
- MODEL 4C: For 14½" South Bend, ¾" capacity Sheldon, Hardinge No. 4, Elgin, etc.
- MODEL 480: For Logan Screw Machine, Turret Lathe and attachments; Warner & Swasey No. 1, etc.
- BREN Collet: For Handwheel & Lever-Type Speedichuk.

KLUTCH - KOLLET (Step Chuck) for chucking work to 2¾" diameter with collet accuracy. Head unhardened for easy boring. Fits 3AT, 3C, 1A adapters only. List unbored \$7.50 each.





PRECISION COLLET DIVISION

765 Canal Street, New York 13, N.Y.

ID

ML

BREN

480 (AC-50)

3C

3AT

Adapters for

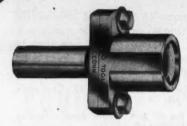
3AT, 3C, 1A

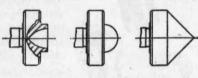
4C

A new tool to help you save time and produce better work

ALCO

COMBINATION ROLLER STOP and SUPPORT





**EXAMPLES OF SPECIAL INSERTS** FOR REVOLVING SUPPORTS

A NEW TOOL FOR YOUR SCREW MACHINES WHICH SERVES A DUAL PURPOSE

REVOLVING STOP — Used as a stop, the new Alco Revolving Stop prevents abuse of the work ordinarily caused by roughness, imperfections or chips which accumulate on a stationary stop. The disc in the Alco Stop revolves concentrically with the work with the concentric action quickly adjustable by the floating alignment feature of the tool. Oil will not splash when the work contacts the stop because the revolving disc is below the outside casing.

REVOLVING SUPPORT — As a support for long work or very accurate forming requiring rigidity, an easy-to-install insert takes the place of the revolving disc to fit the contour of the work being produced. The insert revolves exactly concentric with the work and supports it rigidly at the free end. The use of the Alco Revolving Support will make possible the forming on the sides of many jobs formerly considered impractical on the screw machine.

Eliminates chatter marks caused by vibration . . . No friction between the stop and the work . . . Increased feeds on forming . . . Rigid support on long pieces.

Send for latest catalog ALCO MAKES

HOLDERS, RELEASING MODEL LOW MILL HOLDERS, REVOLV

THE ALCO TOOL CO. BRIDGEPORT, CONN.

Detroit: 908 Stephenson Bldg.

Chicago: 6219 S. Kenwood Ave., Hyde Park 6807

Ma



## Sterling Stainless Steels FOR DISCRIMINATING USERS

#### A complete line of wire, rod and bars

FIRTH-STERLING—a mill with a national reputation for consistently high quality Tool and Alloy Steels—is in a unique position to meet the special requirements of discriminating users of Stainless Steels. Since

1913, when FIRTH-STERLING made the first Stainless Steel produced in this country, we have specialized on made-to-order types for the most exacting specifications. Literature is available, giving complete details.

#### "Sterling" Stainless Steels Meet Special Requirements such as:

- 9. Closely Controlled Compositions.
- 2. Exacting Physical Requirements.
- 3. Surface Perfection in Various Finishes.
- 4. Precise Size and Shape Tolerances.

#### Ask For:

Bulletin No. SL-2009 on Types 420, 440-A, 440-B, and 440-C.

Bulletin No. SL-2010 on Types 403, 410, and 416.

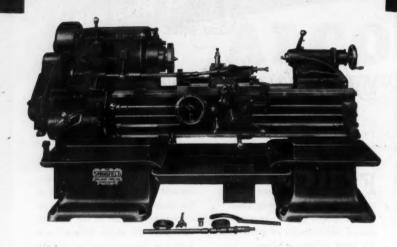
Bulletin No. SL-2011 on Types 302, 303, and 304.

Bulletin No. SL-2018 on Cold Finished Stainless Steels.



Offices: McKeesport, Pa. New York - Hartford - Philadelphia - Cleveland - Dayton - Detroit - Chicago - Los Angeles

## PRECISION and LONG LIFE



SPRINGFIELD Precision LATHES fill the munitions makers' demands for (1) extreme accuracy and (2) maintenance of this accuracy and long life.

Here are some of the factors that account for the sustaining of the original accuracy built into each Springfield Lathe:

HEADSTOCK...12 speeds...only half of the easy-shifting spur gears mesh at one time. APRON...extra heavy...operates on ball and bronze bearings throughout. TAIL-STOCK...all bearings and bed ways oiled from one well.

The SPRINGFIELD LATHE is an outstanding value for both tool room and quantity production use. Write for Bulletin 162.

THE SPRINGFIELD MACHINE TOOL CO.

102

sh cu
Th
wi
Eq

bi

PRECISION
TOOL AND CUTTER
GRINDING

The "Oliver Way"



The cut illustrates the Oliver Ace Tool and Cutter Grinder as regularly supplied for sharpening the General Run of Milling cutters.

The machine as illustrated is equipped with centers for grinding Hobs, Reamers, Taper Reamers, Staggered tooth cutters, etc. Equipment includes an Adjustable Timken Bearing Head with Taper for Mounting End Mills and similar cutters with shanks.

Note the Simplicity of Setup, the ease with which angles are obtained and the possibilities for Rapid Production of individual cutters or quantities of similar cutters.

Don't Neglect

Don't Neglect

Pour Toolroom

Your Backbone

It's the Backbone

of Production!

This is the machine you have heard about; the machine That cutter Manufacturers are using in quantity to Break the Bottle Neck in the production of Milling cutters.

SEND FOR LITERATURE TODAY.

## **OLIVER INSTRUMENT CO.**

1410 E. MAUMEE ST.

ADRIAN, MICHIGAN

vewer

AUTOMATIC DRILL GRINDERS - TOOL AND CUTTER GRINDERS - DRILL POINT THINNERS - TEMPLATE TOOL GRINDERS - FACE MILL GRINDERS - DIEMAKING MACHINES





104

BESLY TAPS · BESLY TITAN ABRASIVE WHEELS BESLY GRINDERS AND ACCESSORIES

see

rep ish

mo

the

the

the

ket

to

bu

Acr

and

tool

AND TA

## 70% COST REDUCTION

THE DAY IS COMING closer when "How much does it cost?" will be a more important question than "When can you deliver?"

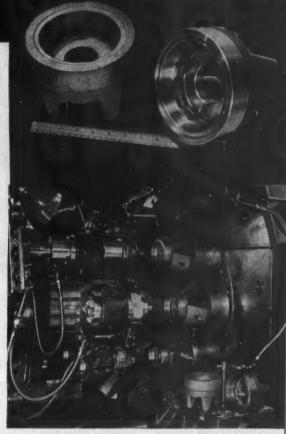
The new Acme-Gridley Multiple Spindle Chucking Automatics are built to produce metal parts at lower costs than industry has yet

Take for example the part shown here. Two Acme-Gridley six spindle chuckers replaced 20 machines in finishing this part and cut the machining costs per piece more than 70%!

Production costs like these will be the basis for the new low selling prices certain to be necessary in the highly-competitive markets ahead of us.

If you have chucking jobs to do, be sure to read new bulletin CM-43.

Acme-Gridley Automatics—4, 6 and 8 spindle—Bar and Chucking give you precision work at speeds and feeds as fast as modern cutting tools can stand.



This 12" RPA six spindle Acme-Gridley Chucker is tooled for 18 separate operations. Job finished in 1/5 the time required by former machining methods—saving equipment, tooling time, power and floor space.

## WATIONAL ACME CO.

170 FAST 1311 STREET . CLEVELAND, OHIO

ACMY CRIDLEY 4 6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS - SINGLE SPINDLE AUTOMATICS - AUTOMATIC THREADING DIES AND TAPS - THE CHRONOLOG - LIMIT AND CONTROL STATION SWITCHES - SOLENOIDS - CENTRIFUGES - CONTRACT MANUFACTURING



For your special cutting tool orders we have modern equipment, skilled workers and the "Know How" to insure accuracy and fine workmanship. At present we can offer attractive deliveries for all types of cutting tools.

Send your inquiries for special cutting tools to A. C. E. Bulletin on request.

AMERICAN CUTTER & ENGINEERING CORP., 31743 Mound Road, Warren, Mich.

## AMERICAN CUTTER

AND ENGINEERING CORP., WARREN, MICH.

SPECIALIZING IN HIGH SPEED EUTTING TOOK TO YOUR PRINTS

## DOUGLAS Precision MACHINES



Showing operation with Universal Milling attachment on tool room job producing a production fixture.





Showing operation with four cut-ters machining alloy steel for high precision aircraft parts

FOR TOOL ROOM AND PRODUCTION

Prompt Delivery **Nar Plants** 

The Rotorex Universal Tool and Cutter Grinder will accurately perform all kinds of tool grinding operations Readily interchangeable attachments are avail-

Operation showing set-up for internal grinding.





Operation showing set-up for sharpening straight gash hobs.



DOUGLAS MACHINERY CO., Inc.

150 BROADWAY

NEW YORK, N. Y



Grinder with Vertical and Herizontal feeds. Available with or without feeds, as preferred.



Grinder with vertical feed and special mounting pad. All models have integral mounting pad for rigidity.



CAN NOW SERVE YOU AS A (STANDARD) GRINDER TOO.

YES SIR! You can now make your machine a "double purpose" machine, the "Standard Way." Standard Vertical Spindle Grinders and Standard Internal-External Grinders can be easily mounted on your Planers, Boring Mills, Shapers, Milling

Machines, etc., giving you added profits

VERTICAL SPINDLE GRINDERS: Sizes range from: 1/2 H.P. to 15 H. P. for straight or cup wheels up to 18' diameter. Also for cylinder wheels, or segmental wheel Speeds: chucks. 1200, 1800, and 3600 R.P.M.

Write for Your copy of Catalog 43, today.





A 2-in-1 precision Tool. You can grind externally, and in a few minutes mount an interchangeable quill for internal grinding up to 24" deep. Sizes: 1/4 H.P. 4" Wheel to 10 H.P. for 20" Wheel.



The STANDARD ELECTRICAL TOOL Co.

CINCINNATI · 4 · OHIO

2487 RIVER ROAD

MODERN MACHINE SHOP

May, 1944

Hollow duced Angle

The Enc fast cor gre om wine On Top" of END I

**ERIES** 

The performance of Brown & Sharpe End Mills is outstanding — they cut fast, they cut freely and their power consumption is low. This means greater production, greater economy and long end mill life.

The <u>rake angle</u> is the result of exhaustive tests. It reduces power consumption and increases the number of pieces per sharpening.

The <u>coarse teeth</u> increase cutting efficiency and stronger teeth are possible through the use of a double angle land.



Hollow faces and rake are produced by a generating process. Angle of rake tends to remain constant as mill is resharpened.



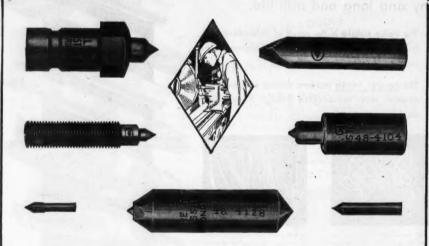
At left-small helix angle for milling slots where accuracy is essential. At right — steep helix angle provides smooth, fast cutting action for most requirements.

We wroze buying through the Distributor

BROWN & SHARPE CUTTERS

EXPERIENCED OPERATORS FOR MANY YEARS
HAVE PREFERRED

# GILMORE DIAMOND TOOLS



From Needlepointed Diamonds for delicate shaping of thread grinding wheels, up to husky diamonds that can take care of heavy centerless-grinder wheels, these tools stand the test for economy and satisfaction.

Circulars on request.

## F. F. GILMORE & CO.

285 Columbus Ave.

Boston (16), Mass.

TAPPING

With speeds from 185 to 3450. R.P.M. available, quick set-ups can be made on multiple spindle machines made on multiple spindle machines for parts having a wide variety of operations. Power feed, back gear, built-in tapping and coolant furnish all the necessary attachments. Footburt Sensitives are rigidly built to drive cutting tools to their full capacity. Write for price and delivery information.

THE FOOTE-BURT COMPANY CLEVELAND 8, OHIO

Detroit Office:

General Motors Building

MOVE UP THE SCHEDULE A WIN THE WAR QUICKER

DRILLING

FOOTBURT ensitive DRILLING MACHINES



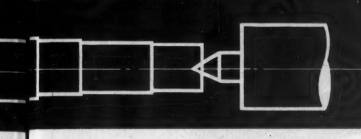
Machining time on this shaft was cut 23%, by using Automatic Feed Changes on a "Monarch Automatic Sizing Lathe". This substantial time saving is especially important today... and also indicates how costs can be cut with modern equipment. This 23% saving will be multiplied by the number of machines attended by each operator.

This specific job has five diameters, with feed rates automatically ranging from ½" to 2" per minute, determined by the depth of cut. Without Automatic Feed Changes, all diameters would be machined at the feeding

rate for the starting diameter.

Monarch Automatic Sizing Lathes, with Automatic Feed Changes, have many applications for step shaft turning and similar work. Our engineers are at your service to see if their advantages can be applied to your work to save time and reduce costs.

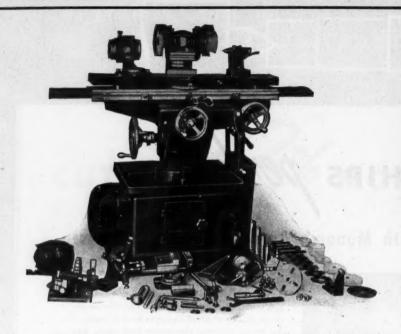
THE MONARCH MACHINE TOOL CO. . SIDNEY, OHIO



# CHIPS per hour

with Monarch Automatic Feed Changes!

Automatic control mechanism is centered in the cabinet which houses the necessary rheostats to control the speed of the 4 to 1 d-c motor driving the entire feed unit. Any desired feed, from lowest to highest, is automatically provided for any or all diameters. Or, the Automatic Feed Change unit may be instantly disconnected, to allow constant feeding rate on all diameters.



# THIS GRAND RAPIDS No. 4 MOTOR DRIVEN UNIVERSAL CUTTER AND TOOL GRINDER

Combines Rigidity with Maximum Convenience of Operation.

It is obtainable with Power Feed providing for 6 Longitudinal Table Speeds, and Wet Grinding feature is also available.

Reasonably Prompt Delivery.

Ask for Bulletin Describing No. 4 and No. 5 Universal Cutter and Tool Grinders.

#### GALLMEYER & LIVINGSTON CO.

308 Straight Ave. S. W.

GRAND RAPIDS

MICHIGAN

114



VERSATILITY has made the Cross No. 50 Industry's champion gear chamfering machine—for small shops as well as large ones.

By means of an economical "pencil-point" cutter, the Cross No. 50 rounds, burrs and recesses all types of internal or external gear teeth.

And because of several exclusive Cross features, inexperienced or unskilled operators obtain smooth finish, precise spacing and accurate reproduction of form. For instance, the Cross Pitch Selector provides quick adjustment of a single cam for any tooth size and pitch. Average set-ups can be completed within 15 minutes. The work is clamped by means of foot pedal control, leaving the operator's hands free for loading.

These and other features of the Cross No. 50 are described in a special folder which is yours for the asking. Just write The Cross Company, Detroit 7, Michigan.



Machine Tools



#### Stopit for less than 1c a man per week

When workers sweat their systems lose essential salt... And salt is essential. It gives tone to the blood. It keeps body fluids in equilibrium. It helps maintain proper body temperatures.

Loss of this salt through sweating dehydrates the body... thickens the blood... causes Heat-Fag. The resulting fatigue and inalertness make production sag and accidents rise.

To drink water alone is not the cure. It only dilutes the body fluids. The result is heat cramps... and more loss of production.

The real answer, recommended by industrial doctors and endorsed by America's greatest corporations, is to place salt tablets at every drinking fountain. Then, workers who sweat can get the salt they need when they take a drink of water. Morton's Salt Tablets are the easy, simple, sanitary way to replace the body salt sweated out. And the cost is less than 1 cent a man per week.





#### QUICK DISSOLVING (Less than 30 Seconds)

This is how a Morton's Salt Tablet looks when magnified. See how soft and porous it is inside. When swallowed with a drink of water, it dissolves in less than 30 seconds.

Case of 9000, 10-grain salt tablets \$260

Salt-Dextrose tablets, \$315



#### MORTON'S DISPENSERS

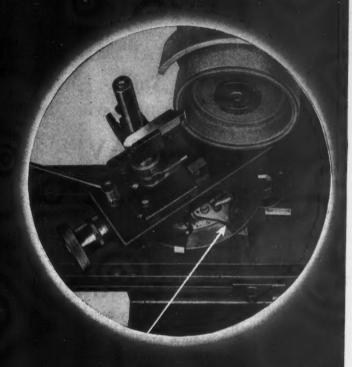
They deliver salt tablets, one at a time, quickly, cleanly — no waste. Sanitary, easily filled, durable.

800 Tablet size - - - - - \$3.25

Order from your distributor or directly from this advertisement . . . Write for free folder.

MORTON SALT COMPANY, Chicago 4, III.





W. F. MEYERS COMPANY, Inc. • Established 1888

#### PART NUMBERS



#### LETTERING

#### GRADUATIONS

ROLLED

#### BY MACHINE

ON

FLAT and ROUND SURFACES

Sure - Fast - Accurate

OBSOLETES HAND STAMPING

SAVES ABOR STAMPS

Eliminates POOR MARKING ERROR - NOISE

Speeds . . . DELIVERIES

#### ALSO ADAPTED TO CERTAIN KNURLING OPERATIONS

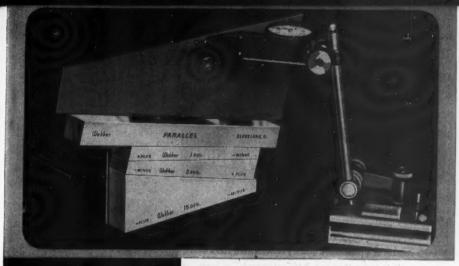
This Hydraulic Machine will mark piece parts quickly and accurately. It is serving in the war effort in many plants for marking components of guns. tanks, planes, motors, engines, shells, and practically every metal part produced for war equipment. Machine will mark unlimited number of sizes and shapes when equipped with proper tools and fixtures. It will also do an excellent knurling job on solids and shells of small diameters.

Designed and Built By

GEO. T. SCHMIDT, INC.

1806 BELLE PLAINE AVENUE

**CHICAGO 13, ILLINOIS** 





Also Manufacturers of Webber Micro-accurate Gage Blocks

# Someday YOU'LL MEASURE ANGLES This Way!

WHY? . . . Because in WEBBER ANGLE GAGE BLOCKS you have the Fastest . . . Easiest . . . Surest means for precision angle measurement.

If you're not using WEBBER ANGLE GAGE BLOCKS now the chances are mighty good that you will in the near future—when all the many advantages of this new-est of all methods of angle measurement are entirely familiar to you.

Not only because it's new . . . not only because it's different . . . but because it offers definite time and cost saving features which are becoming more and more important both on war production and your future output in competitive markets—you will want to use this modern quick method of measuring angles.

There's no doubt about it—someday you'll measure angles this way—with WEBBER ANGLE GAGE BLOCKS.

WEBBER ANGLE GAGE BLOCKS are furnished in sets consisting of 14 blocks which produce 370,800 angles accurate to within ½ second of an arc. Angle measurement with these blocks is simple—fast and ultra-accurate. Complete information is contained in a new booklet.

Write for your copy today.

Webber GAGE COMPANY



NO"RE-CONVERSION" PROBLEM

## STANDARD Carboloy Tools

WHEN you use STANDARD Carboloy Tools you obtain top performance—maximum economy—on your war applications now, and at the same time remain in a position to quickly convert your stock of tools to peace-time use. With "standards" as basic stocks, you grind to special shapes to fill current needs only, and keep reserve stocks in the form of standard styles for quick, future conversion.

STANDARD Carboloy Tools, adaptable to 60%-80% of all single-point turning, boring and facing applications in the average plant—are available in 10 styles, all commonly used sizes, and a range of grades for maximum results on cutting steel, cast iron, non-ferrous metals and non-metallics. Write for catalog GT-175.

#### Adaptable

TO 60%-80% of all single-point-tool Turning, Boring, Facing Applications—for war or peace.



Write for NEW catalog GT-175



Training film strip available showing rapid grinding procedure

#### CARBOLOY COMPANY, INC.

11143 E. S MILE BLVD., DETROIT Birmingham • Chicago • Cleveland • Los Angeles • Newark • Philodelp

Pitthurgh + Seettle

To Cotton STEEL CAST IRON STEEL STEEL STEEL

TUNGSTEN CARBIDES • • • TUNGSTEN CARBIDES WITH TANTALUM AND/OR TITANIUM CARBIDES